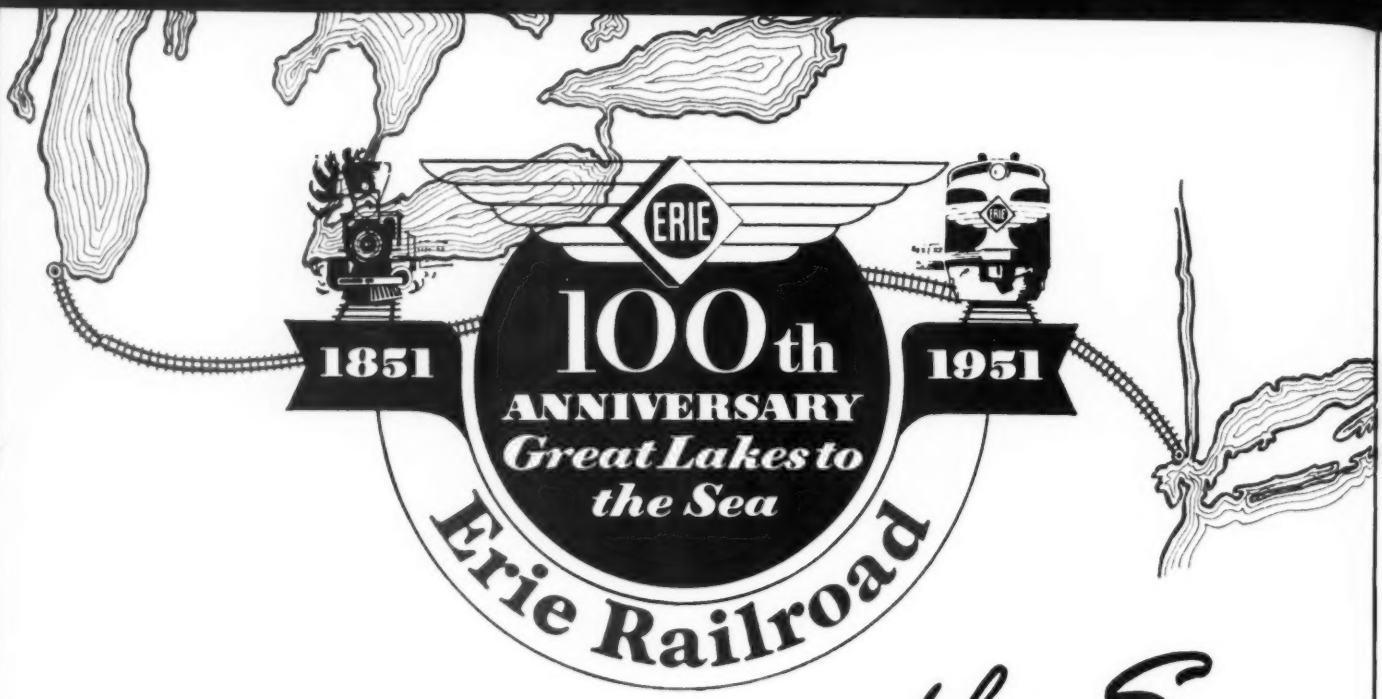
Engineering and Maintenance



Great Lakes to the Sea

RELIANCE hy-crome spring washers help the Erie keep track joint bolts *tighter longer*

Congratulations to the management and men of the Erie Railroad on completion of a century of service to the area from the "Great Lakes to the Sea."

A hundred years is a long time, — especially to "new-comers" like ourselves who have been in business just forty-one years. We are inspired by the indomitable courage, the foresight and aggressive perseverance which have made the Erie a vital force in the section of the nation it serves and a recognized leader in transportation progress. We are proud to have been chosen to serve, even in a small way, such an important factor in the railroad industry.

May your second century bring even higher achievements and greater successes.

The Edgemark Of Quality

EATON

EATON MANUFACTURING COMPANY

EATON **RELIANCE DIVISION, MASSILLON, OHIO**

Sales Offices: New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montreal

Published monthly by Simmons-Boardman Publishing Corporation, 79 W. Monroe St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Marion, Ind., post office. Address communications to 79 W. Monroe St., Chicago 3, Ill. Volume 47, No. 5.

YOUR **EXTRA EMPLOYEE** THAT WORKS WITHOUT PAY

RACINE *Unit* TIE TAMPER

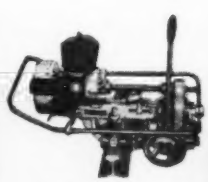
If you had an extra man working eight hours per day, you'd notice the increase in tamped track. A Racine Unit Tie Tamper provides that increase — GIVING YOU THE EQUIVALENT OF EIGHT HOURS MORE WORK EVERY DAY.

Racine Unit Tie Tampers speed up your work and increase manpower efficiency by reducing fatigue. Easily carried, easily operated, shock-free — they team up productively with your operators.

You get longer tool life with less machine maintenance, more uniformly compacted ballast that remains properly placed longer. All these are extras that make the Racine Unit Tie Tamper a valuable employee to serve you capably for a long, long time. Write for free 3-color catalog.

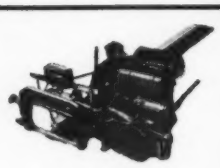
- LIGHT IN WEIGHT (60 lbs.)
- SHOCK-FREE OPERATION
- 1500 BLOWS PER MINUTE
- EASY STARTING MAGNETO IGNITION
- BALANCED RECOIL—SMOOTH ACTION
- LOW MAINTENANCE COST
- 80% IMPROVEMENT IN TOOL LIFE
- LONG TROUBLE-FREE LIFE

OTHER PORTABLE MACHINES BY RACINE



Racine Bond Drill

Racine Rail Drill



Racine Rail Cutter

RACINE

TOOL AND MACHINE COMPANY

1738 State Street, Racine, Wis.

STANDARD FOR QUALITY AND PRECISION — RACINE — RACINE TOOL and MACHINE CO.

In the heart of the job—
on America's Leading Railroads . . .

THE leading railroads of the country have proved Northwests on their maintenance-of-way and storeyard jobs. The Northwest Crawler is a real railway man's machine. Its simplicity alone makes it worth considering. The rugged design and construction with its cast steel bases and cast steel machinery side frames, stands up under heavy railway service — keeps shafts in alignment — and reduces wear. Easy operation, the result of the "Feather-Touch" Clutch Control, increases operating safety and keeps the output curve up. Northwest steering and Northwest Crawlers, with their self-cleaning action, takes Northwests where other machines have difficulty and make loading and unloading easier.

You are making long-time plans. The Northwest is the machine for the heart of your maintenance-of-way jobs and you can't afford to have anything but the best in the heart of the job! Plan to have Northwests in those *Key Spots*. Make it the Key Machine and your first Northwest will make you a repeat order-buyer.

NORTHWEST ENGINEERING CO.
1513 Field Bldg., 135 South LaSalle St.,
Chicago 3, Illinois

NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
SHOVEL • CRANE • DRAGLINE • PULLSHOVEL

Does 6 different jobs with help of 22 TIMKEN® bearings

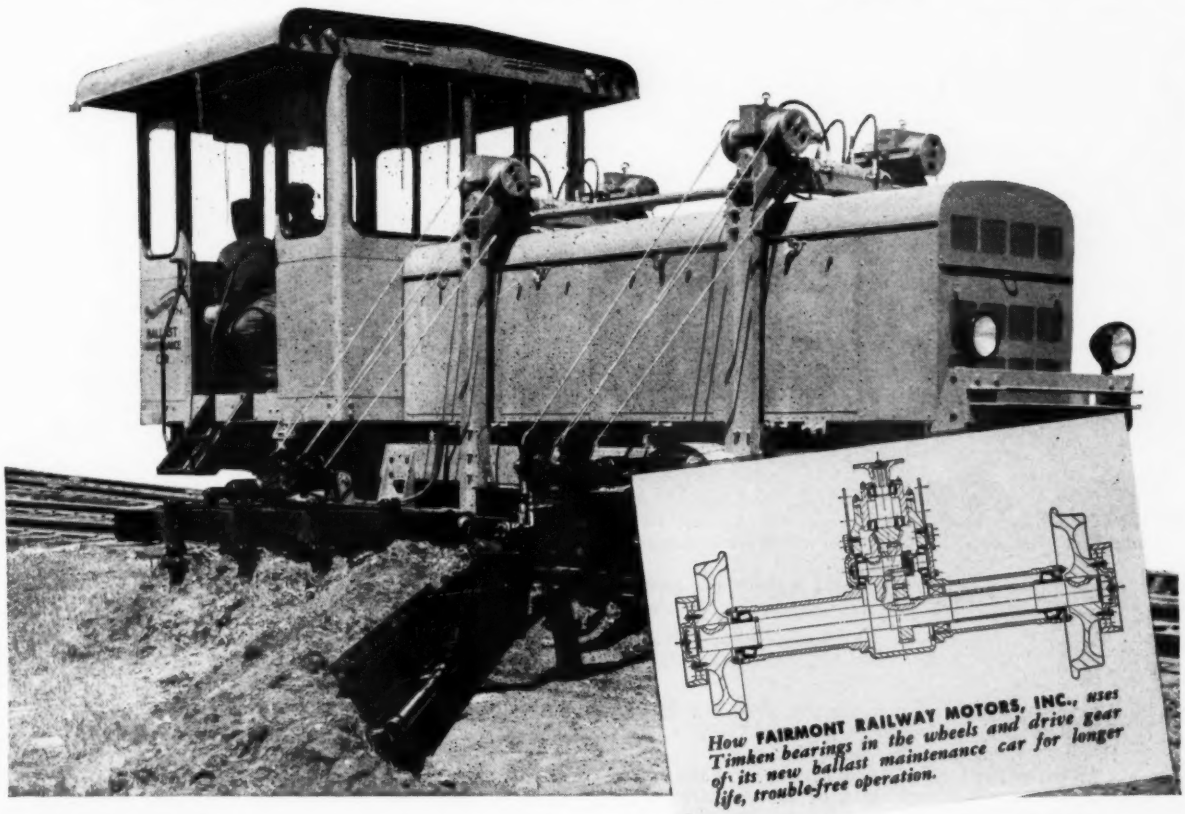
ROADBEDS are kept in top condition with this new Fairmont ballast maintenance car. Six different work tools can be mounted on the machine—scarifiers, a ten-foot blader, a 76-inch blader, ballast equalizing boxes, discs, and a center plow. And 22 Timken® tapered roller bearings in the wheels, drive gears, speed reducers and transmission help keep the car working with minimum time-out for maintenance and repairs.

Timken bearings hold shafts in proper alignment, keep gears meshing smoothly and accurately. There's less wear on moving parts. Because tighter closures are permitted, lubricants are kept in—dirt and grit kept out.

The tapered construction of Timken bearings enables them to take any combination of radial and thrust loads. There's extra load-carrying capacity in Timken bearings because of line contact between rollers and races. Timken bearings are engineered for the job, precision manufactured, and made of Timken fine alloy steel. That's why they normally last the life of the machine.

For over half a century the outstanding performance of Timken bearings has made them first choice throughout industry. Make sure you specify them in the equipment you buy and mount them in the machines you build. Always look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **FAIRMONT RAILWAY MOTORS, INC.,** *uses Timken bearings in the wheels and drive gear of its new ballast maintenance car for longer life, trouble-free operation.*

WE MAKE OUR OWN STEEL

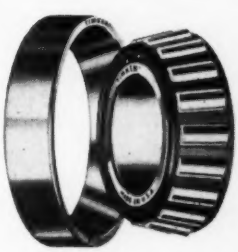
The special grade alloy steel which gives Timken bearings their strength and resistance to wear, is made in our own steel mills.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

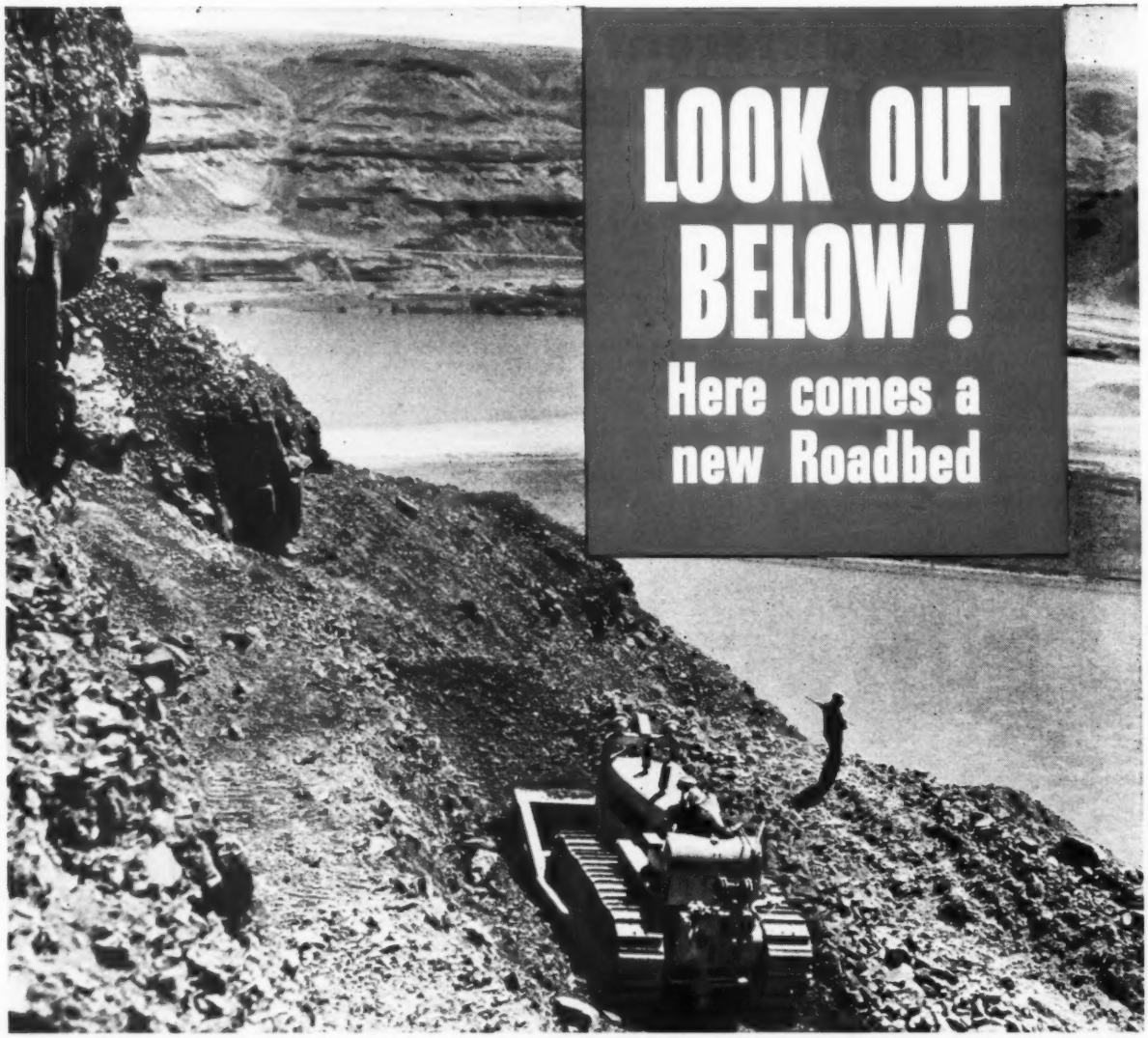
TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ **NOT JUST A ROLLER** ▭ **THE TIMKEN TAPERED ROLLER** ▱ **BEARING TAKES RADIAL** ◫ **AND THRUST** ◫→ **LOADS OR ANY COMBINATION** →◫←



Dozin' High—International TD-24 slices off the top of a treacherous 700-foot talus slide to raise grade of railroad at water level below.

Half a million yards of fill are dozed from the side of Columbia Canyon by International TD-24's

In taming the rampaging Columbia River McNary Dam will flood the old roadbed of the Seattle, Portland & Spokane Railroad.

To raise the tracks out of the reach of the rushing river took a mountain of fill. A giant talus slide, towering over the work area, was available, but this loose volcanic rock, ideal for fill, looked impossible to work.

That's when they put International's big red Champ—the TD-24—on the job.

Sure-footed power and finger-tip steering let the TD-24 work the loose slide without mishap—to itself, to its operators, or to the trains and crews operating seven hundred feet below. Precision bulldozing—made possible only by the TD-24's exclusive control features that give it unmatched mobility—let the rail traffic continue until the new roadbed could be completed.

This kind of International performance is one big reason why you see more and more International power "workin' on the railroad" all over the country.

Ask your International Industrial Distributor for the whole story on International "power that pays"—and his shops, trained personnel, full stocks of parts to keep it paying out for you year after year.

INTERNATIONAL HARVESTER COMPANY, Chicago 1, Ill.

INTERNATIONAL INTERNATIONAL HARVESTER **POWER THAT PAYS**

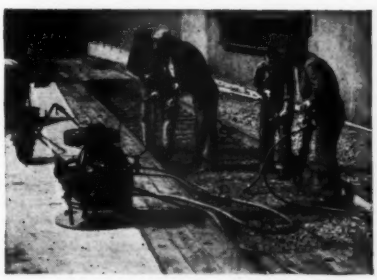
New 36 cfm

Ingersoll-Rand SPOT-AIR 3R-36

. . . a 4-Tool Air Compressor for Maintenance of Way

Ingersoll-Rand now offers the 3R-36 SPOT-AIR as the lightest, most compact section-gang compressor of its kind. The self-contained arrangement of three power cylinders and three air cylinders mounted radially around a vertical crankshaft gives a smooth conversion of engine torque into air power.

This versatile air power unit is completely air-cooled thus permitting operation in any kind of weather with no danger of freezing or overheating. The SPOT-AIR stands only 32 inches high on a 27 inch diameter baseplate, making it ideal for between-track work. See your nearest Ingersoll-Rand representative for the full story on the 3R-36 SPOT-AIR.



Big enough **to operate four I-R tie tampers**

Light enough **to be handled by two men**

Rugged enough **to take a lot of punishment**

- **36 cfm free air delivery at 80 psi**
- **Weighs only 265 lb . . . less than any compressor of its type**
- **Extremely portable with wheelbarrow mounting**

Other IR *Air Power equipment for maintenance of way*

SPIKE DRIVERS	WOODBORERS	BACKFILL TAMPERS
GRINDERS	RIVETING HAMMERS	PAVING BREAKERS
IMPACTOOLS	RIVET BUSTERS	PUMPS
WIRE BRUSHES	SCALING TOOLS	UTILITY HOISTS

Ingersoll-Rand

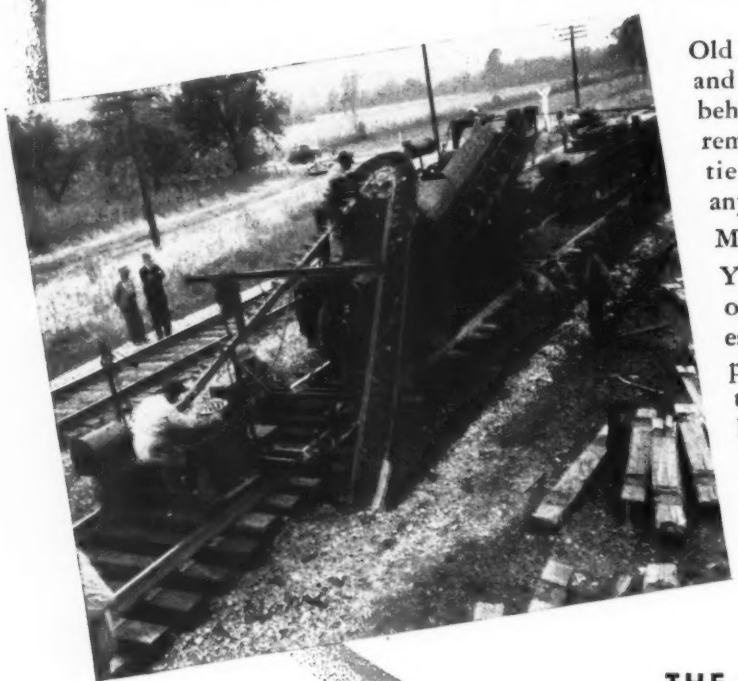
11 BROADWAY, NEW YORK 4, N. Y. 565-2

PRECISION
Trackwork Combination

Matisa
BALLAST CLEANER

CLEANING... AS ONLY *Matisa* CAN DO IT

● Cleans *under* ties, as well as in cribs ● Permits *lowering* track profile as much as 18 inches ● One-man machine operation ● Off-track parking on lines in service ● Self-powered for cleaning and travel



Old methods of cleaning only shoulder and crib ballast had an excellent reason behind them: If ballast under ties was removed, there was no assurance that tie seats could be recompacted with any degree of precision.

Matisa has changed all that:

You can have existing ballast thoroughly cleaned—track profile re-established at a higher, or at a lower profile—then Matisa precision tamping to *guarantee* firm tie seats on a clean ballast cushion.

Details on Matisa Ballast Cleaner rentals and availability are yours for the asking. Write Matisa M. W. Engineering Department.

THE MATISA EQUIPMENT CORP.
224 South Michigan Blvd.
Chicago 4, Illinois

Matisa TAMPER

TAMPING . . . AS ONLY Matisa CAN DO IT

- ***Pressure*** **— not pounding action.**
- ***Vibration*** **for rapid and complete elimination of ballast voids.**
- ***Horizontal*** **tamper-shoe motions for positive tie-seat ballast support.**
- ***Independent*** **tamping control for either or both rails.**

You will get a new concept of what a tamper should be when you see the Matisa Tamper at work . . . automatically putting precision seats under ties up to 600 feet per hour . . . stabilizing a dipped rail joint properly raised on one side, without humping the rail opposite . . . compacting ballast to stay without pounding it to powder or damaging tie edges. And then take a look, or a ride on track tamped by Matisa years ago . . . as smooth now as the day it was tamped, with *settling averaging less than ¼-inch!*

There are Matisa Tampers and Matisa-tamped track somewhere in your vicinity . . . Or we will be glad to show you motion pictures which will provide an extensive field trip in your own office. Write our M. W. Engineering Department for data.

Trackwork Specialists All Over the World

MORE WORK-TIME

In work train fleets, or on independent off-track operation, Koehring **HEAVY-DUTY** ¾-yard 304 protects your work schedules against costly down time . . . its heavy-duty "plus" insures continuous dependable performance during rush periods, war crises and all other emergencies.

All-welded, box-type shovel boom and double dipper sticks . . . plus torsion-resistant shipper shaft mounted on top of deep boom mid-section . . . withstand twists and strains of heaviest digging. One-piece chain, inside boom, gives powerful, positive crowd. Big booster clutch cuts normal lever pull over 50%, reduces operator fatigue . . . yet retains "feel" of load. Heat compensator spring makes tension changes automatically, maintains full clutch efficiency at all times.

Koehring 304 lifts 13.9 tons on crawlers . . . up to 25 tons on rubber-tired truck or cruiser mounting. Other Heavy-Duty sizes lift up to 79½ tons . . . have dipper capacities to 2½ yards.

SELF-PROPELLED RAILAID

works both on and off-track, travels at 4 rail speeds up to 14.4 m.p.h. Crane loads and unloads itself on ramp-equipped propulsion car in less than 10 min. . . . lifts 6.6 tons from carrier, 8¼ tons from ground . . . converts to clamshell, dragline, ½-yd. shovel, hoe.

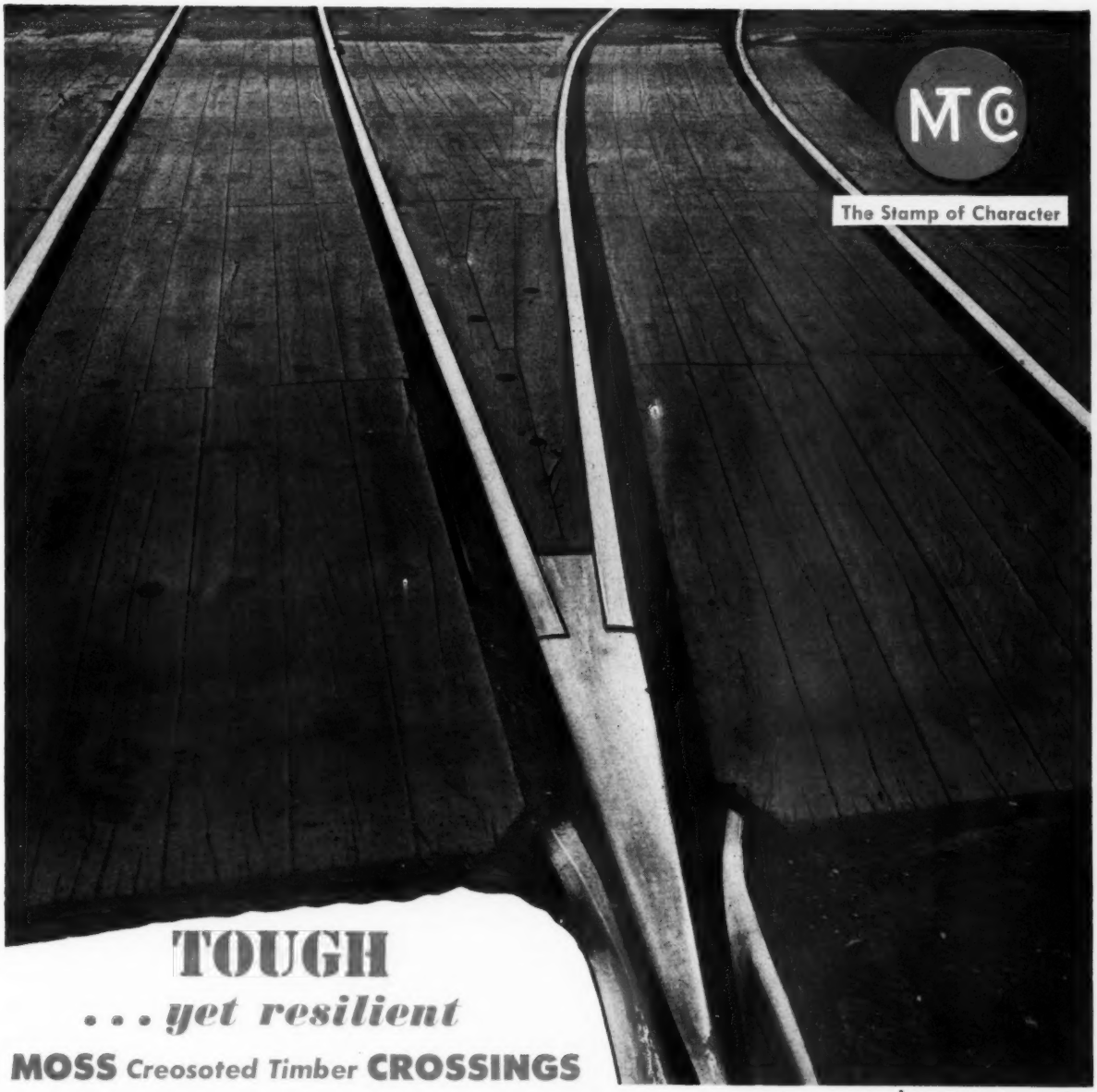
RAILROAD MUD-JACK®

stabilizes track beds without interrupting rail traffic. Injection points are driven into water or ballast pockets in sub-grade . . . hydraulic pump forces soil-cement slurry into weakened area, stabilizing existing material . . . leaves firm, lasting sub-grade.

KOEHRING HEAVY DUTY

KOEHRING COMPANY, Milwaukee 16, Wis.

(Subsidiaries: JOHNSON • PARSONS • KWIK-MIX)



TOUGH

. . . *yet resilient*

MOSS *Creosoted Timber* CROSSINGS

BATTERING, punishing traffic day in and day out . . . the jarring, twisting effect of heavy railroad equipment . . . all this is taken in stride by Moss Crossings. Sturdy, tough yet resilient, Moss Crossings of creosoted timber have that imperceptible "give" which enables them to take constant and heavy punishment. Many Moss Crossings have given over 15 years of service with little apparent deterioration.

Next time, order Moss Creosoted Timber Crossings. Further information and prices gladly furnished on request.

SIX REASONS WHY MOSS CROSSINGS ARE SUPERIOR

- Made exclusively of rugged timber for maximum strength and uniformity.
- Easy to remove for track work.
- Highest quality preservative forced in under pressure, protecting against rot.
- Easy and economical to install.
- Bolted together for tighter fit.
- Full salvage value if removed to another location.

T. J. MOSS TIE COMPANY

700 SECURITY BUILDING • SAINT LOUIS 2, MISSOURI

Cross Ties • Switch Ties • Poles and Posts • Piling • Crossings

WOOD PRESERVING PLANTS: Mt. Vernon, Ill.; E. St. Louis, Ill.; Granville, Wis.; Shreveport, La.; Columbus, Miss.

STRENGTHENING — Arc welding a flange reinforcing plate to a floor-beam of a railroad bridge. Airco No. 78E or 387 electrodes are generally used for this type of work. Strengthening operations like this prolong the life of a bridge far beyond normal expectancy.

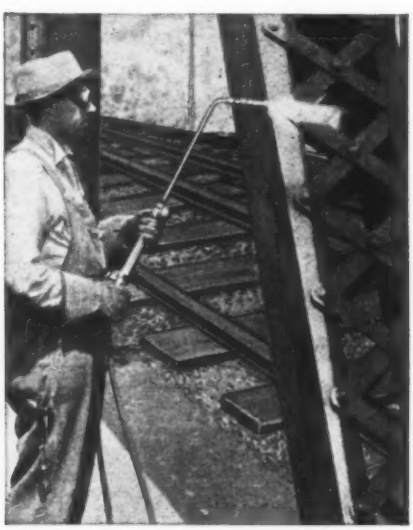
"SHRINK" FITTING — Standard Airco oxyacetylene flame heating equipment is used to take the slack out of eye-bar tension members. Eye-bars as heavy as 10" x 2" can be shrunk without any apparent effect on fatigue strength or static strength.

"Beef up" AIRCO HELPS A BRIDGE

Today's diesel-powered fast-moving trains, plus stepped-up traffic requirements, call for "beefing up" bridges and other right-of-way structures to the point where these heavier loads may be carried with "top" safety and less maintenance.

For this reason many leading railroads are turning to versatile Airco oxyacetylene and arc welding processes. These time-tested, proved techniques are used to strengthen and reinforce bridge structures by welding plates, angles and other shapes to floor-beams, stringers, chords, and similar bridge members. All reinforcement materials can be easily and inexpensively cut to size with Airco oxyacetylene gas cutting equipment.

If you have a problem that calls for "beefing up" right-of-way structures to handle today's high-powered equipment, and stepped-up traffic, one of Airco's Railroad technical men will be glad to work with you — help you develop better methods of maintaining this highly important equipment. Get in touch with your local Airco office today for complete information.



FLAME CLEANING — Proper painting is vital to the life of a bridge. Here, Airco's Style 800 torch with Style 110 round tip loosens old paint, scale and rust, and drives off moisture. Flame cleaning is inexpensive and fast—often it's the only satisfactory way to prepare lattice-like structures for painting.

Costs Come Down Under the Airco Plan

AIRCO

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY
AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY, INTERNATIONAL
Divisions of Air Reduction Company, Incorporated
Offices in Principal Cities

Here's what WE mean by

DESIGNED FOR YOUR JOB

The new Allis-Chalmers tractors are not merely new models incorporating refinements of existing ideas . . . they are *new from the ground up* . . . without compromise anywhere in design or material.

They are the answer to your demands for tractors that will give you outstanding performance on a variety of applications — whatever those jobs may be.

Behind the design are your own ideas . . . and those of your operators and mechanics . . . combined with the vast experience of Allis-Chalmers.

Check the following outstanding features . . . then get the full story from your Allis-Chalmers dealer on this — "THE FINEST TRACTOR LINE ON EARTH."

POWER TO SPARE — A large untapped reserve (up to 1/3 of peak available hp.) assures easier going on toughest work — longer engine life, less servicing. Moreover, it has been proved that General Motors 2-Cycle Diesels are unmatched in lugging ability; they build up torque faster and higher . . . hold it longer.

MATCHED POWER TRAIN ASSEMBLIES — Each and every part of the power train — from master clutch to final drive — has more than enough capacity and strength to handle any load it was ever meant to carry. Bigger clutches, booster steering, double-reduction final drives, all add life—get more work done.

REVOLUTIONARY SHIFT PATTERN — A quick, one-lever shift from any forward speed to any reverse position saves shifting motion and time — smoother and easier, too.

POSITIVE BALANCE — Tractors work equally well with any equipment — drawn or mounted. There's *greater stability* and *traction* with more track on the ground and lower structural weight. Main and truck frames are heavier, truck frames longer . . . idlers are bigger, and both idlers and sprockets lowered . . . all steel construction throughout. Up to 50 percent more ground clearance!

ALLIS-CHALMERS

TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

The Newest, Finest Tractor Line on Earth!

40.26 drawbar hp.
11,250 lb.

70 drawbar hp.
18,800 lb.

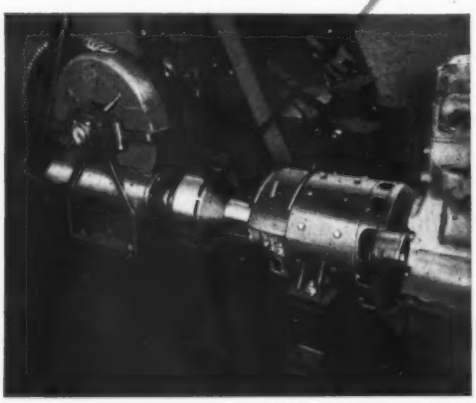
102 drawbar hp.
27,850 lb.

Hydraulic Torque Converter Drive
175 net engine hp.
41,000 lb.

- **DESIGNED FOR YOUR JOB**
- **BUILT TO "TAKE IT"**
- **EASY TO OPERATE**
- **EASY TO SERVICE**

NOW STANDARD ON BROWNHOIST LOCOMOTIVE CRANES . . .

new dyna-matic clutch



142-A

For Smooth, Acceleration, and Control of Hoist, Rotating and Travel

The new, electrically operated DYNAMATIC CLUTCH, available as standard equipment only on Brownhoist Diesel Electric locomotive-cranes, provides a smooth, responsive flow of power never before possible with the usual disc or mechanical clutch for transmitting power to the machinery of a crane. The DYNAMATIC CLUTCH is essentially a driven rotor revolving on anti-friction bearings within a rotating coil energized by a small flow of current from the starting battery. The new DYNAMATIC CLUTCH has a 32-step control. Power response is steady and sensitive. Loads may be raised, lowered, or rotated smoothly and accurately without the use of mechanical brakes. Torsional impulse and vibration from the power source is completely eliminated. The DYNAMATIC CLUTCH provides a cushion between the engine and crane machinery. When clutch is fully engaged there is no appreciable slippage. Since there is no contact between the revolving field and armature, there is no friction between moving parts nor drag between the parts when the controller is in the off position — no parts need replacement other than inexpensive brushes. The new DYNAMATIC CLUTCH is one more good reason it pays to buy a BROWNHOIST.

BROWNHOIST

INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Pittsburgh, Cleveland, San Francisco, Chicago, Canadian Brownhoist Ltd., Montreal Quebec. **AGENCIES:** Detroit, Birmingham, Houston, Los Angeles.

NOW! when maintenance is more important than ever

Make car lumber LAST!

use Penta*-Protected wood

Heavy traffic does not *have* to mean more maintenance for busy equipment. You can cut maintenance by protecting car lumber, and all lumber, with PENTA . . . and give your wood longer, more dependable life.

PENTA protects wood against termites and decay, gives wood greater serviceability. PENTA-PROTECTED WOOD is clean, easy to handle and can be painted. PENTA is economical, too!

Railroad service records *prove* that treated wood lasts three to four times longer than untreated wood. This means that PENTA-PROTECTED WOOD costs you *less per year!*

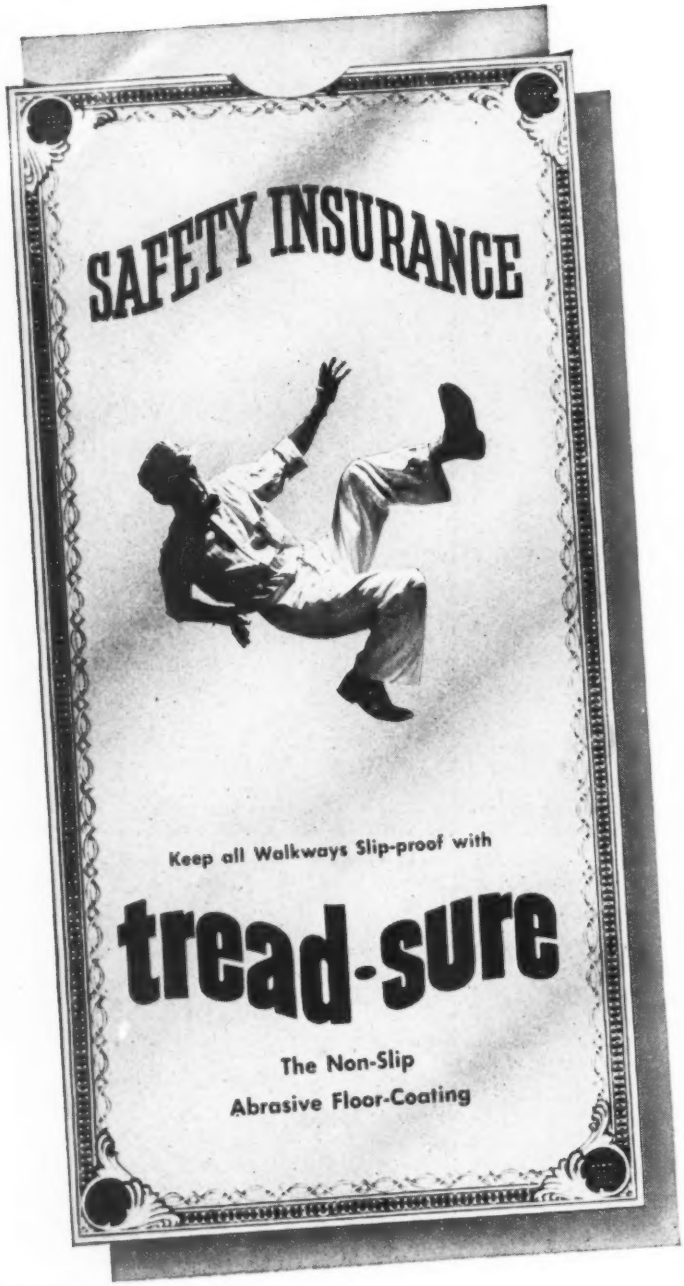
USE PENTA-PROTECTED WOOD not only for car lumber but also for poles, loading platforms, all wood buildings and other wood construction. Protect your investment in wood. Make it a *sure* thing . . . with PENTA!

INVESTIGATE Penta THE CLEAN WOOD PRESERVATIVE

*PENTA is a popular abbreviation of the name of the chemical, PENTAchlorophenol

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

DOW
Penta
chlorophenol



Horn Tread-Sure produces a heavy long-wearing anti-skid surface on wood, concrete or steel. Tread-Sure is an abrasive filled brush-coating, simple and inexpensive to apply on any size area.

Tread-Sure is resistant to gasoline, alcohol, oil, grease, detergents, industrial waste and many types of acids. Tread-Sure provides a non-skid safety footing, giving the worker confidence and security by reducing accident hazards.

Tread-Sure maintains traction and resiliency and is comfortable to stand on. Designed for exterior as well as interior use, it may be brush applied over other paint or direct to unpainted surfaces. Used as it comes from container. Three non-glare colors—Battleship Grey, Red, Green.

Uses for Tread-Sure	Used in
Steps and stair treads	Industrial
Aisles—walkways	Plants,
Ramps—gangplanks	Food,
Grease racks—work benches	Milk,
Running boards	Meat Plants,
Washrooms—showers	Hotels,
Elevator floors—landings	Hospitals,
Machinery platforms	Schools,
Scale platforms	Railroads,
Foot pedals	Utilities,
Decks—hatch covers	Service Stations

SUBSIDIARY OF SUN CHEMICAL CORPORATION

horn

A. C. HORN COMPANY, INC.

MANUFACTURERS OF MATERIALS FOR BUILDING MAINTENANCE AND CONSTRUCTION

10TH STREET & 44TH AVENUE, LONG ISLAND CITY 1, N. Y.

LOS ANGELES • SAN FRANCISCO • HOUSTON • CHICAGO • TORONTO

HORN PRODUCT

RE-51

GENTLEMEN:

Please send complete data on TREAD-SURE.

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

For additional information, use postcard, pages 415-416

ADDITIONAL INFORMATION

On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

Products Index

A

Abrasive Floor Coatings 414
Air Compressors 405, 424, 465
Air Dump Cars 486
Air Tools 405
Aluminum Jacks 473, 477
Anchors 427
Arc Welding 410
Asbestos—Bonded Pipe 430
Asphalt 488

B

Backfill Blades 465
Backfill Tampers 405
Ballast Cleaners 406, 407
Ballast Cleaning Service 482
Ballast Coatings 488
Bearings, Roller 403
Blowers 421
Bolts 426
Bonding Drills 400
Brick Waterproofings 426
Bridge Coatings 435
Bridge Flooring 480
Brush Killers 417, 420, 471
Brush Killing Service 428
Brushes 435
Buildings, Prefabricated 480
Bulldozers 404, 418, 419

C

Car Couplers 481
Cement Waterproofings 426
Chain Saws 421, 424
Chemicals
413, 417, 420, 435, 471, 478
Clamshells 408, 475
Corrugated Metal Pipe 480
Corrugated Metal Structures 430
Couplers 481
Cranes 401
408, 412, 424, 475, 484, 485
Crawler Cranes 401, 408
Crawler Tractors 404, 411
Creosote Sprayers 431
Crossings, Highway 409
Culverts, Corrugated Metal 480

D

Derails 424
Diesel-Electric Locomotives 438
Doors, Metal 480
Draglines 401, 408, 475
Drills 400, 402, 424, 479

E

Earthmoving Equipment 401, 404
408, 418, 419, 475, 483, 486
Electric Heaters 438
Electric Locomotives 438
Electric Motors 438
Electric Plants 421, 426
Electric Tie Tampers 422, 423
Electric Tools 424
Engines 425

F

Fasteners 426
Flame Cleaning 410, 449
Flangeway Cleaners 431
Floodlights 438
Floor Surfacings 414
Foundation Coatings 426
Front-End Loaders 465
Front-End Shovels 483

G

Gasoline Engines 425
Gasoline Tie Tampers 400
Generators 421
Glass 435
Goggles 472
Grinders 405, 424

H

Hardness Testers 470
Highway Crossings 409
Highway Guard Rails 480
Highway—Rail Cars 436
Hoists 405
Hook Bolts 426
Hydrants 472

I

Impact Tools 405
Impactors 424

J

Jacks ----------473, 477
Joint Oilers ----------431

L

Lighting Systems ----------438
Locomotive Cranes
----------412, 424, 475, 484
Locomotives ----------438

M

Mobile Cranes ----------408
Motor Cars---------431, 436, 474
Motors ----------438
Multi-Plate Structures ---------430

N

Non-Slip Floor Coatings------414

O

Overhead Loaders ----------483
Oxyacetylene Equipment -----410

P

Paints ----------435
Paved—Invert Pipe ----------430
Paving Breakers ----------405
Pentachlorophenol ----------413
Pipe ----------485
Pipe Arch ----------430
Plastics ----------435
Power Distribution Systems---438
Power Plants
--421, 422, 423, 426, 438, 465
Power Shovels ----------408
Prefabricated Buildings ------480
Pullshovels ----------401
Pumps-------405, 421, 424, 486

R

Rail Anchors----------427
Rail Benders ----------479
Rail Cranes ----------424, 484
Rail Drills ----------400, 402
Rail Expanders ----------477
Rail—Highway Cars ----------436
Rail Joint Packing----------467
Rail Joints ----------397
Rail Saws ----------400
Rivet Busters ----------405
Riveting Hammers ----------405
Roller Bearings ----------403
Rotary Pumps ----------424
Rubber Tired Bulldozers--418, 419
Rust Preventives
----------435, 446, 476, 485

S

Saw Guides ----------472
Saws---------400, 421, 424, 470
Saws, Chain ----------421
Scaling Tools ----------405
Scrap ----------399
Scrapers ----------418, 419
Shovels ----------401, 475
Signal Power Systems---------438
Snow Plows ----------465
Spike Drivers ----------405
Sprayers ----------424, 431
Spring Washers----398, 425, 487
Steel ----------399
Stud Welding Process---------456
Surfacing Jacks ---------473, 477

T

Tapered Roller Bearings------403
Tapes ----------470
Tie Cutters ----------431
Tie Plate Spacers----------431
Tie Pushers ----------474
Tie Seasoning ----------469
Tie Spacers ----------477
Tie Tampers
------400, 406, 407, 422, 423
Timber Conservation ---------469
Timber Crossings ----------409
Track Drills ----------424, 479
Track Jacks ----------473, 477
Track Shifters ----------477
Tractor Controls ----------485
Tractor Scrapers --------418, 419
Tractors------404, 411, 465, 485
Turbine Pumps ----------486

U

Unit Tie Tampers---400, 422, 423
Utility Hoists ----------405

W

Washers ----------398, 425, 487
Waterproofings ----------426
Weed Burners ----------431
Weed Killers
------417, 420, 471, 478, 485
Weed Killing Service
------420, 428, 433, 471, 485
Welding ----------410
Welding Equipment ----------432
Welding Rods ----------432
Well Water Systems----------486
Wheeled Tractors ----------465
Wire Brushes ----------405
Wood Preservatives ----------413
Woodborers ----------405
Work Equipment ----------436

It costs less to keep out unwanted growth with Chapman Chemicals

WHAT'S YOUR PROBLEM?

■ New chemical developments make it possible for railroads to maintain a clear right-of-way and clean track-ballast and trestle areas with less labor and at far less cost than by methods formerly used.

For clean track ballast area, spray with Sodium TCA. It kills foliage and roots of such perennials as Johnson, Bermuda, Quack, and Blue grasses. In areas where only control of grass foliage is desired, use Penta Weed Killer . . . the cheapest and most effective contact herbicide.

For clear right-of-way, use Chapman Brush Killer. It effectively controls weeds, vines, brambles, and other woody growth, without killing grasses.

For bare ground under trestles, use Borascu to sterilize the soil and stop all growth. It is non-poisonous and non-combustible. One application may last two years or longer.

The great variety of plant life, climatic conditions and soil types make it impossible to offer any one chemical prescription for all weed killing problems. We will be glad to give you recommendations applying to your problems.

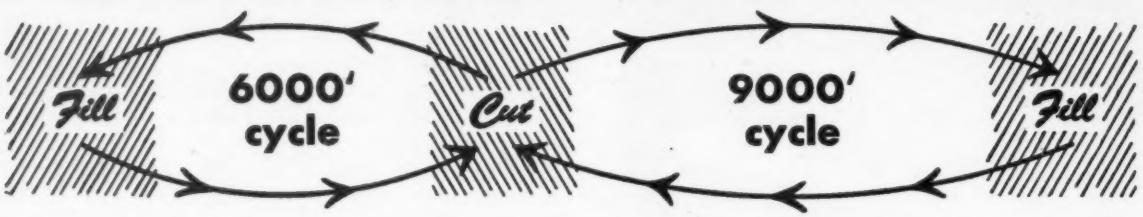
CHAPMAN CHEMICAL COMPANY
Dermon Building, Memphis 3, Tenn.

CHAPMAN®

Weed Killers

SODIUM TCA • CHAPMAN BRUSH KILLER • PENTA GENERAL WEED KILLER • BORASCU

On CGW job 2 C-TOURNAPULLS alternating move 156



Regarding the Chicago Great Western Railroad right-of-way a mile south of Kenyon, Minnesota, Carl Bolander & Sons Company, of Minneapolis, put dirt-moving on a high-speed basis. With 19,000 cubic yards of heavy, boulder-laden clay to move on hauls of 1/2 to 4/5 of a mile one-way, they drove in 2 high-speed, electric-control C Tournapulls and 1 rubber-tired, 186 h.p. C Tournadozer. Here's typical performance:

Build fill at both ends of cut

High-speed Tournadozer, used primarily as a pusher, helped each Tournapull load 10 pay yards of damp, loamy clay in approximately 1 minute. Hauling in a "figure-8" pattern, the Tournapulls spread alternately on two fills . . . the first fill, 4500 ft. north of the cut; the second fill, 3000 ft. south of the cut. Each rig completed the 9000-ft. cycle in an average of 8.6 minutes . . . the 6000′ cycle in 6.7 minutes . . . averaged 7.8 trips hourly on the two hauls. That's 78 pay yards per hour per unit . . . or a combined output of 156 yards hourly for the 2 Tournapulls.

Average 17.5 m.p.h. between jobs

Both the Tournapulls and the Tournadozer showed a lot of other speed advantages which railroads like. When Bolander started the job, the 3 LeTourneau rubber-tired rigs drove down from Minneapolis, where they had just finished grading a parking lot. Tournapulls made the 70-mile trip through main highway traffic in 4 hours driving time . . . Tournadozer took 6 hours.

On the job or driving job-to-job, Tournapull's and Tournadozer's fast, rubber-tired speeds pay off for railroads in a big way. They cross tracks without blocking, travel along track or right-of-way, keep mainline clear for traffic, need no special work trains, move anytime, anywhere, without tying up cars and without loading expense and delay.

LETOURNEAU LET EQUIPMENT

Mail today to: **R. G. LeTOURNEAU, INC., Peoria, Ill.,** for more information on 35 m.p.h.

NAME..... TITLE.....
COMPANY.....
STREET.....
CITY..... STATE.....
Type of work.....

186 h.p. C Tournapull for use with:

- ☐ 19 m.p.h., rubber-tired Tournadozer
- ☐ 15-yd. Carryall Scraper
- ☐ 17-yd., rear-dump Tournarocker
- ☐ 19½-yd., bottom-dump Tournahopper

on 6000' and 9000' cycles pay yards hourly

Batopilas's rubber-tired C Tournadozer was a big factor in helping maintain this high production record. Its 186 h.p. "push", synchronized with Tournapull's 186 h.p. "pull", consistently put 10 pay yards of damp loam and clay into the scraper bowl in 60 seconds. Loading distance averaged 125 ft.

New...

C Tournapulls now have 18-ton Carryall increasing capacity to 15 yards. Prime movers with Tournamatic constant-mesh transmission and torque converters are also now available, as well as the "Roadsters" with their heavy-duty, truck-type transmission. Performance figures reported here were made with earlier 13.5-yard (16-ton) Roadsters.

When not in use for pusher-loading, Tournadozer handled small fill assignments. Above, Tournadozer tucks fill material around culvert . . . driving over tracks wherever necessary . . . and shuttling back and forth between production and utility jobs in spare time at speeds up to 19 m.p.h.

Tournapull, Tournadozer—Trademark Reg. U.S. Pat. Off. C144

LET

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Peoria, Illinois

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It's a one-man chain saw that really does the work of a two-man saw.

Whether you're cutting trees, wreckage or piling, a Homelite will give you the fastest possible cutting. Cuts an 18 inch tree in 16 seconds. Cuts trees 48 inches or more in diameter. Has simple, safe controls, automatic clutch; automotive type carburetor, rainproof magneto and chrome-plated perma-sharp, narrow kerf chain.

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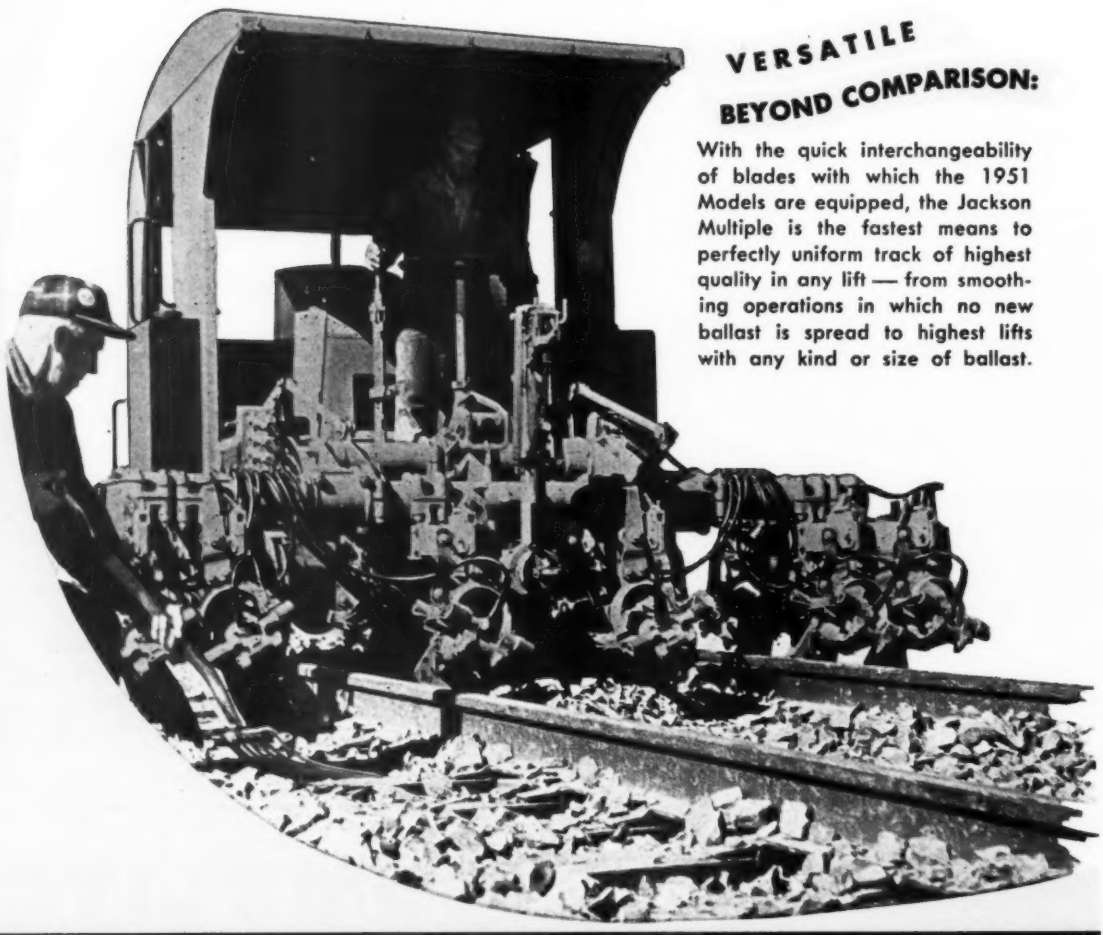


VERSATILE BEYOND COMPARISON:

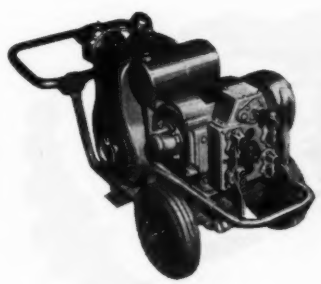
With the quick interchangeability of blades with which the 1951 Models are equipped, the Jackson Multiple is the fastest means to perfectly uniform track of highest quality in any lift — from smoothing operations in which no new ballast is spread to highest lifts with any kind or size of ballast.

ELECTRIC TAMPER & EQUIPMENT CO., Ludington, Mich.

JACKSON
UNIT TIE TAMPERS

Greatest Expediters of Section Gang Productiveness! Surpassed, in EXTRA Gang Service, ONLY by the JACKSON MULTIPLE!

By any comparison you wish to make, you'll find Jackson single unit tie tampers and Jackson Power Plants the finest means of mechanizing your section gangs and solving the labor shortage problem. The Power Plant, which serves one to four tampers, is easily portable and therefore suitable to the very small section gang employing only two tampers, as well as being ideal for the normal size gang. And since it generates both single-phase and 3-phase, 115 volt 60 cycle AC it may be used for lights and operating power tools as well as tamping. Quick interchangeability of blades makes the tampers exceptionally adaptable to every use to which tampers may be put, and where sections are equipped with these four-tamper outfits, they may be grouped for extra gang service in major ballasting operations with results that are exceeded only by the Jackson Multiple Tie Tamper. Let us tell you more about them.



Jackson Model M-2 Power Plant from which 1 to 4 tampers may be operated. Other models of 2 and 8-tamper capacity are available.

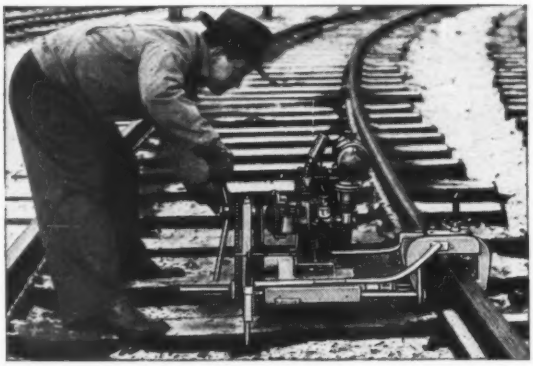
ELECTRIC TAMPER & EQUIPMENT CO., Ludington, Mich.

SERVICE MORE TRACK IN LESS TIME FOR LESS MONEY - -

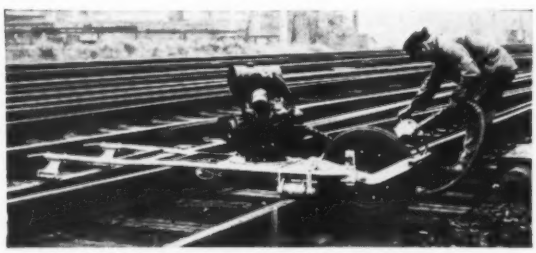
WITH SPEEDY, EASY-OPERATING RTW DRILLS AND GRINDERS

Low-cost low manpower RTW Drills and Grinders speed up your maintenance work . . . enable you to keep rails shipshape without crowding your track gangs . . . and save you money to boot!

Two popular RTW maintenance machines are shown below—others available also give you labor-saving advantages at substantial savings.



RTW'S MODEL P-43 POWER TRACK DRILL gives you 60-second drilling . . . quick, accurate drill-leveling . . . easy-acting, easily-controlled screw feed . . . easy-handling (aluminum castings keep weight down to 125-lbs.) . . . quick on/and/off-rail action . . . chuck jaws that take beaded bits up to 1½" and automatically stay open when chuck is loosened.



RTW'S MODEL P-44 PORTABLE FLEXIBLE SHAFT GRINDER is designed to give you added savings in labor and costs when you lay new track or repair old.

Grinder's 360° swivel engine mount prevents short bends and kinking of flexible shaft . . . clutch assembly in the engine protects shaft from overload . . . three position wheel clears switches and crossovers easily . . . light and compact, it gets on and off the track fast . . . quickly adaptable for auxiliary equipment: Straight Wheel Hand Piece, Angle Hand Piece for Cup Wheel, Cross Grinder Guide and Track Drill.

Write today for further information on the P-44 Portable Flexible Shaft Grinder, the P-43 Power Track Drill and other easy-to-operate RTW equipment.

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Q and C Hand Throw Derails may be adjusted in the brackets to fit a range of rail sections which eliminates carrying many sizes in stock.

Sliding Type and Portable Derails are also available.

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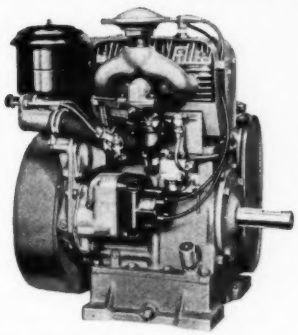
POWER ADVANTAGE
In the 7 to 13 hp. Range
...The 2-cylinder
WISCONSIN
Air-Cooled ENGINES



TE and TF 4-cycle 2-cylinder standard engines, 7 to 13 hp.

Here is the POWER ADVANTAGE story of the 2-cylinder Wisconsin Heavy-Duty Air-Cooled Engines, the development of which fills the need for a power linkage between the single-cylinder and four-cylinder types.

HEAVY-DUTY SERVICE FEATURES INCLUDE:

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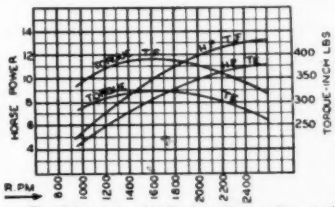
3. Rotary type high tension OUTSIDE Magneto with Impulse Coupling operates as an entirely independent unit that can be serviced or replaced in a few minutes.
4. Maximum torque at usable speeds for equipment that really has to go to work.

SPECIFICATIONS

MODELS	TE	TF
Bore.....inches	3	3¼
Stroke.....inches	3¼	3¼
No. of cylinders	2	2
Displ. cubic inches	45.9	53.9
H.P. and R.P.M. range	7.2 at 1400	8.6 at 1400
	11.2 at 2600	13.3 at 2600
Net weight in lbs., Standard engine, side-mount tank	220	220
Standard power unit	255	255
Added weight for clutch	35	35
Added weight for clutch reduction	85	85



POWER CURVE AND HORSE-POWER LISTING SHOWS MAXIMUM DYNAMOMETER HORSE-POWER OF ENGINE complete with fan, muffler, and air cleaner. For continuous heavy-duty operation do not rate the engine at more than 80% of the horsepower shown at any given speed.

The Wisconsin Air-Cooled Engine line includes 4-cycle single cylinder, 2-cylinder and V-type 4-cylinder models in a complete power range from 3 to 30 hp. Detailed engineering data and descriptive bulletins on request.

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World's Largest Builders of Heavy-Duty Air-Cooled Engines
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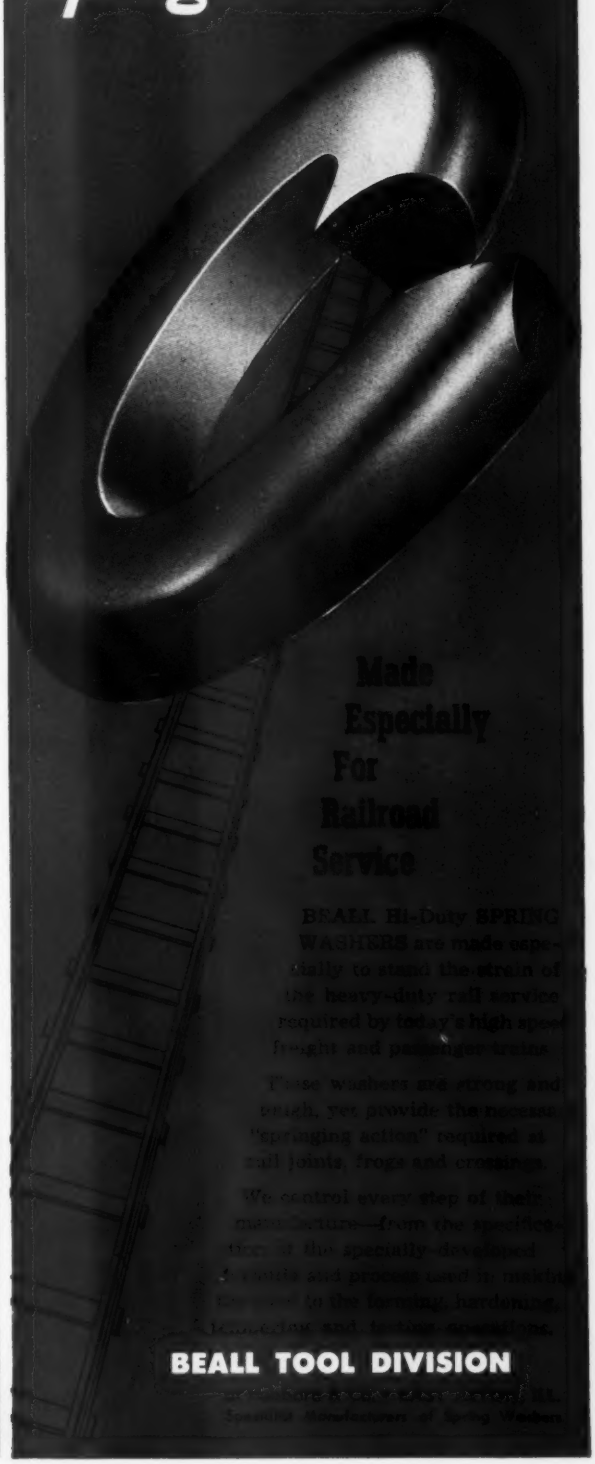
BEALL
Spring Washers



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BEALL Hi-Duty SPRING WASHERS are made especially to stand the strain of the heavy-duty rail service required by today's high speed freight and passenger trains.

These washers are strong and tough, yet provide the necessary "springing action" required at rail joints, frogs and crossings.

We control every step of their manufacture—from the specifications of the specially-developed steel to the finished product—in the forming, hardening, tempering and finishing operations.

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SEALTITE HOOK BOLT

1 Fins prevent turning.
2 Fins seat without side pressure.
3 Drives easily.
4 Same size hole makes better installation.
5 Washer nut stops seepage and locks through nail hole.
6 Has reinforced hook.
7 Hook angle furnished to fit job.

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SEALTITE HOOK BOLTS

Because railroad trestles and bridges are constantly exposed to corrosive conditions we recommend the economy of ordering your hook bolts in the Sealtite Double-Life Hot-Dip galvanized finish sealing the bolt in zinc which retards all corrosion and saves expense of frequent replacement.

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Cut Costs, Speed Work
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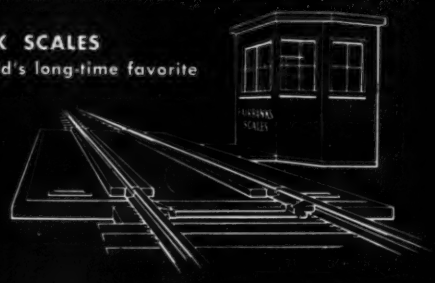

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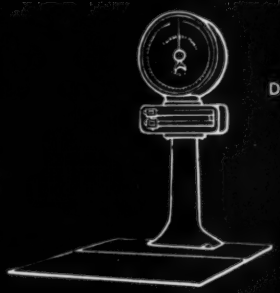

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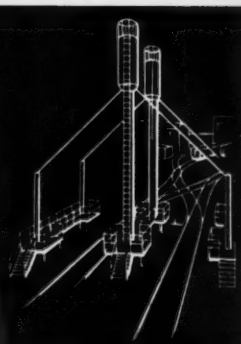

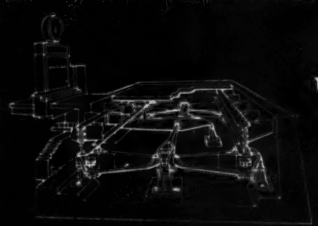

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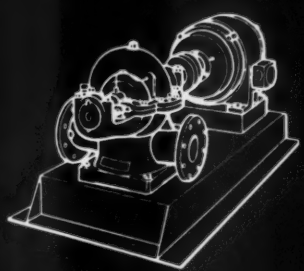

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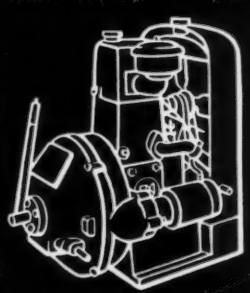

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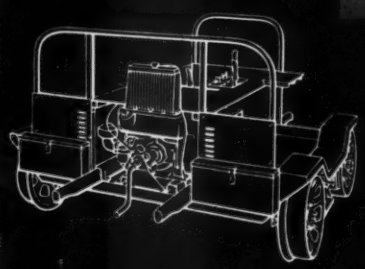

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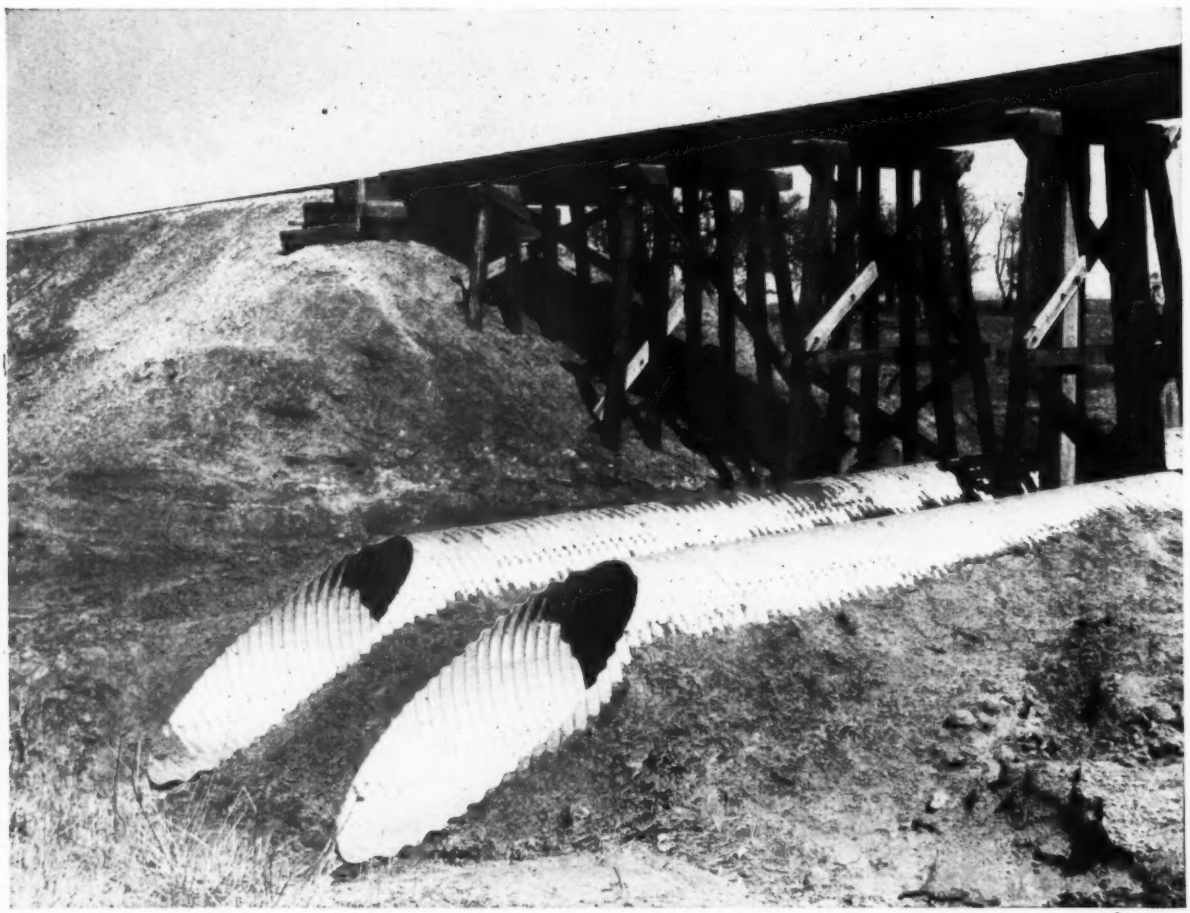

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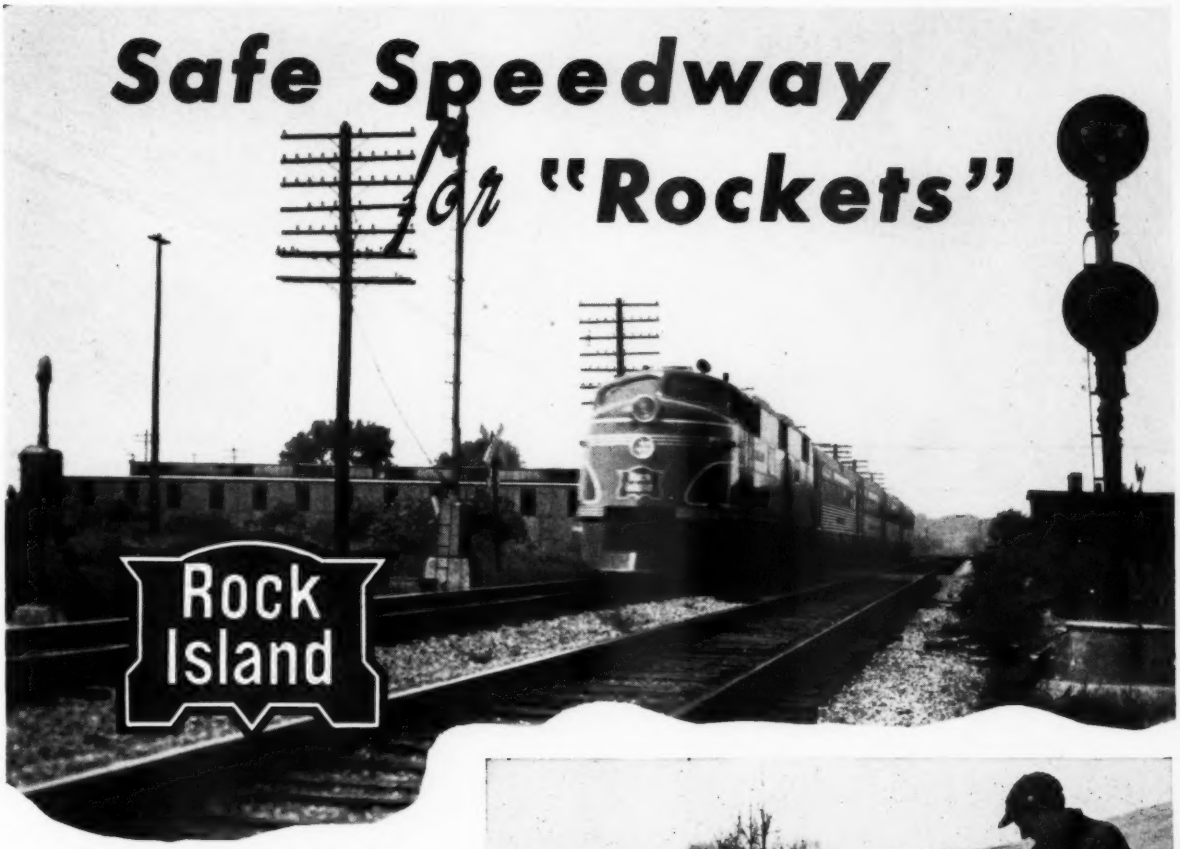

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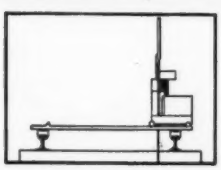

Figure 1—Making first cut at right end of tie, close inside rail.

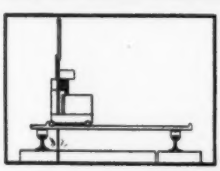

Fig. 2—With machine moved to left end of tie, making second cut.

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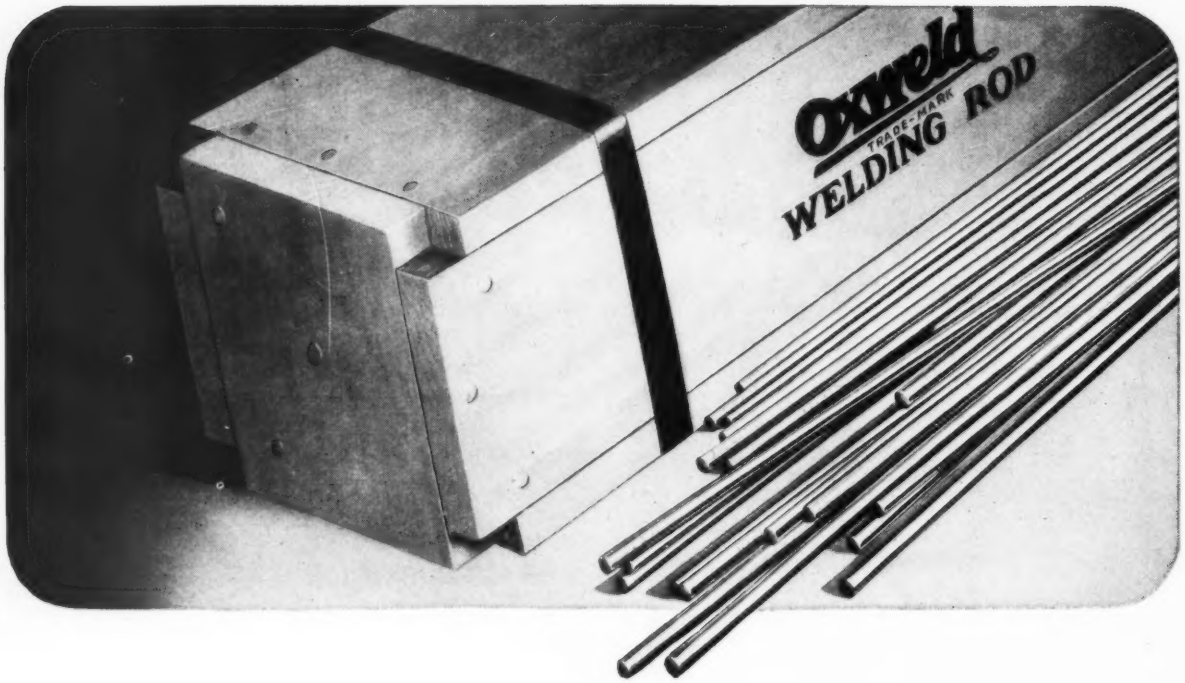

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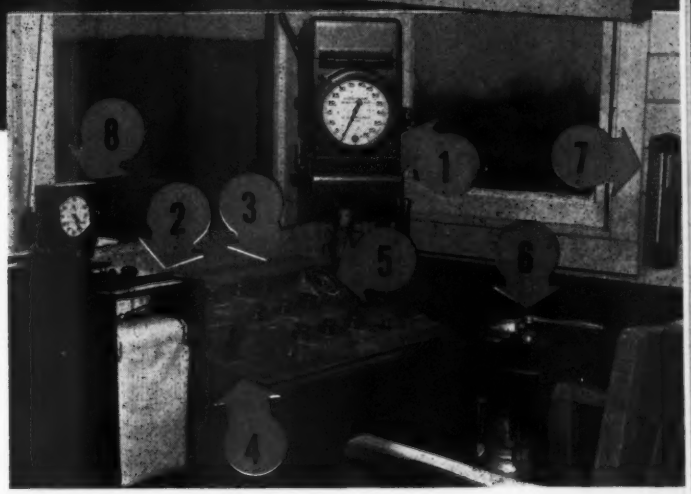

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No. 269 of a series

Railway Engineering and Maintenance

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Subject: Keeping Up-to-Date

May 1, 1951

Dear Readers:

Keeping up-to-date the appearance of the editorial section of a magazine presents a problem that does not lend itself to solution by any simple formula. Last December I discussed on this page our policy relative to the amount of space devoted to photographs and other types of illustrations, but this is only one aspect of the problem of producing an attractive, readable magazine.

There is, for example, the little matter of typography—the kind or "face" of type to be used for the titles, the subheads or boxes, the captions for illustrations, and even the text of the articles. What about the amount of white space to be left around the heads or titles of articles and the illustrations? Should color be used in the editorial pages, and, if so, in what manner? How much space should be devoted to the various departments —editorial comment, editorial feature, What's the Answer?, News of the Month, and Products of Manufacturers? Are the designs for the department heads attractive, modern and adequate in every way?

These are some of the questions that must be kept constantly in mind if we are to continue to put out a magazine that is "on the button". The difficulty is in knowing when to make changes. Having once arrived at a formula that results in an attractive, well-balanced book the easy thing to do is to go along from month to month without giving too much thought to the matter of making changes. This attitude must be avoided at all costs. The other extreme is to follow the policy of making frequent changes simply for the sake of change. This too must be avoided; changes should only be made when there is a definite reason for them and when they add something to the book that it didn't have before.

What the problem boils down to is a matter of judgment on the part of the editors. By this I mean judgmemt based on observation of all pertinent factors, such as modern trends in magazine publishing and reactions received from readers. Then, too, it is helpful to submit copies of the publications occasionally to a consultant in editorial makeup for study and comment, but it is necessary to remember that the ideas of such individuals are also based largely on judgment.

In designing an editorial format it is not sufficient merely to aim at an attractive appearance in keeping with other similar magazines. A magazine must, in addition, have a personality of its own. But when you try to make a magazine conform to modern publishing practices while at the same time making it somehow different from others, you are up against an extremely difficult problem. I hope you feel that we of the Maintenance staff have been reasonably successful in solving this problem.

Yours sincerely,

Merwin H. Dick

MHD:amj

Editor

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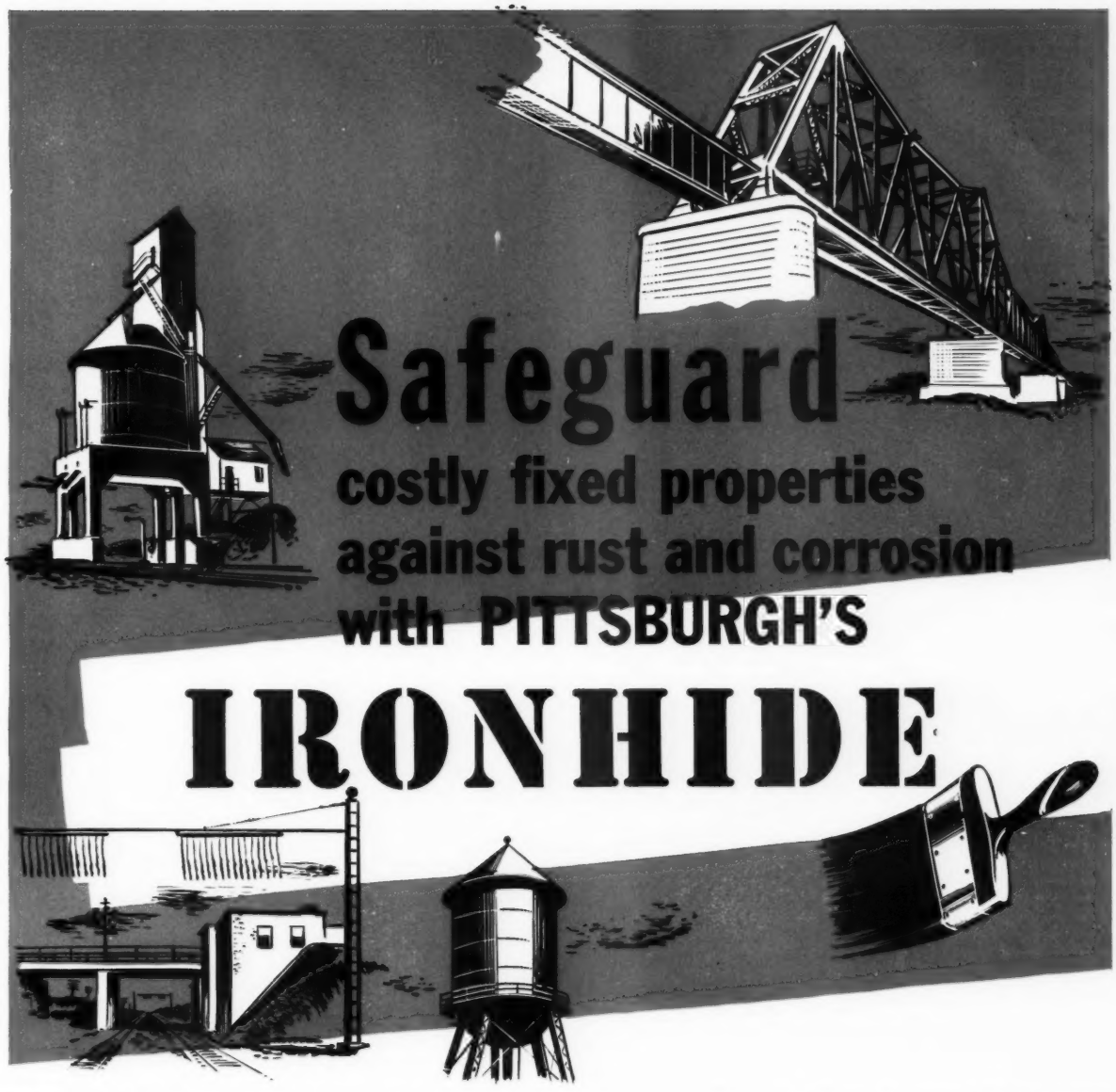

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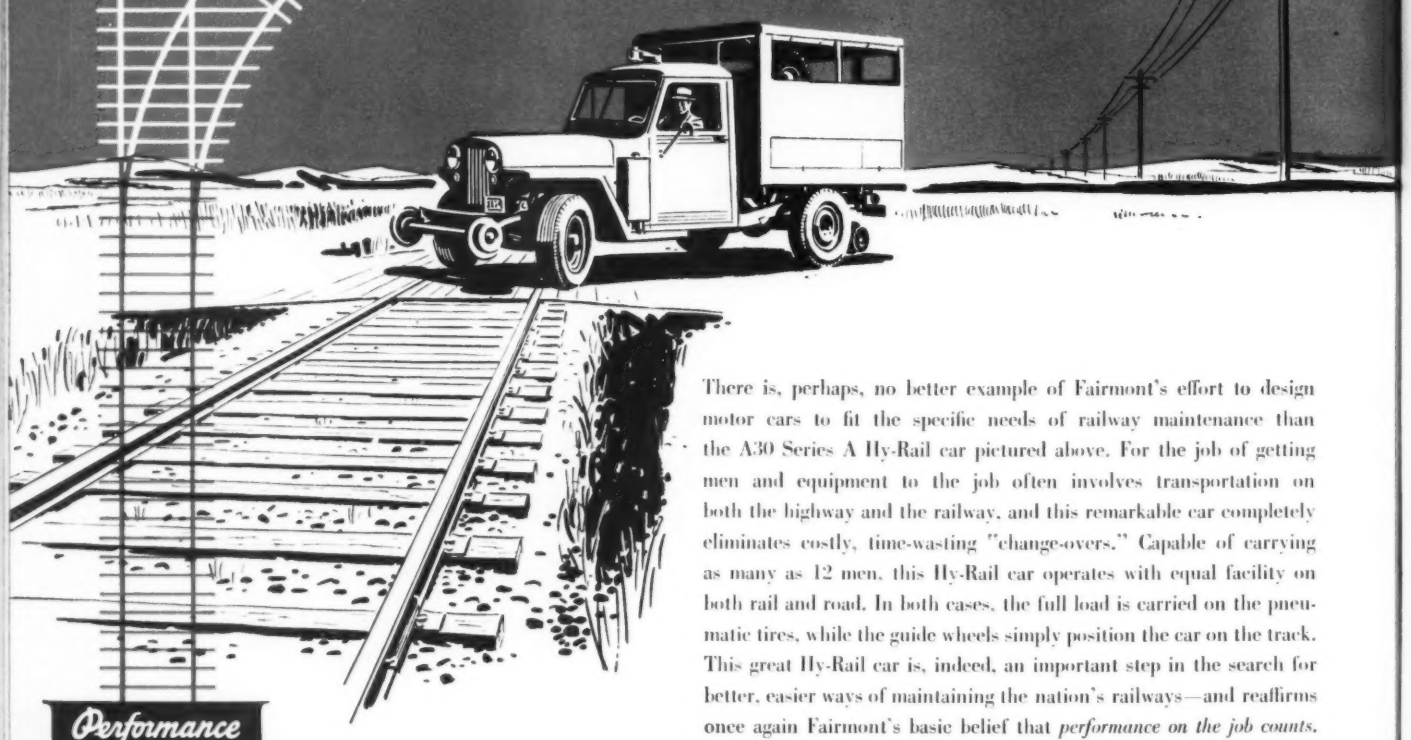

There is, perhaps, no better example of Fairmont's effort to design motor cars to fit the specific needs of railway maintenance than the A30 Series A Hy-Rail car pictured above. For the job of getting men and equipment to the job often involves transportation on both the highway and the railway, and this remarkable car completely eliminates costly, time-wasting "change-overs." Capable of carrying as many as 12 men, this Hy-Rail car operates with equal facility on both rail and road. In both cases, the full load is carried on the pneumatic tires, while the guide wheels simply position the car on the track. This great Hy-Rail car is, indeed, an important step in the search for better, easier ways of maintaining the nation's railways—and reaffirms once again Fairmont's basic belief that *performance on the job counts.*

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VOL. 47, NO. 5 MAY, 1951

Editorials ---- 439
Plan Now — Scrap — Equipment Care

Research Attack on the Shelly-Rail Problem ---- 441
An address presented by L. S. Crane before the annual meeting of the A.R.E.A. as a supplement to the report of the Committee on Rail

For Effectiveness—"Zone" Your Earthmovers ---- 444
F. E. Schaumburg explains, with the aid of a chart, how to select the type of equipment most economically suited to any specific job

Coal Chute Comes Out of "Mothballs" ---- 446
Tells how the Frisco preserved an idle steel structure for 23 years, then moved it and converted it into a sand chute

Test Effectiveness of Organic Synergists in Foam Control ---- 447
Abstract of an article by L. O. Gunderson and C. M. Bodach, presented before the Midwest Power Conference at Chicago in April

Instructions Give Proper Flame-Cleaning Techniques ---- 449
Part II of a two-part article presenting safe, practical and economical practices in flame-cleaning or flame-priming steel structures

Machine for Hardening Rail Ends ---- 453
Describes the construction and operation of a unit developed by the Southern in collaboration with the Air Reduction Sales Company

Welded Fasteners for Roofing and Siding ---- 456
Describes the use of special studs for fastening to buildings such materials as corrugated metal or asbestos, steel and aluminum

Union Pacific Gets New Detector Car ---- 459
Describes the construction and operation of a new unit which locates rail defects with special magnetic equipment

What's the Answer? ---- 460
Use of Autos by Supervisory Men
Improving Quality of Safety Signs
How Many Men Per Foreman?
Attachments on Railway Machines
Securing Open Deck to Steel Bridges
Calibrating Fuel-Oil Meters

Products of Manufacturers ---- 470

What Our Readers Think ---- 472

The Month's News ---- 473

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152-18

Plan Now—

For Lower Maintenance Costs in Future

At the present time railway business is relatively good. Which means that maintenance men on the whole have received relatively generous allotments to carry out their 1951 work program. This is a good thing; in addition to taking care of current wear and tear there is a considerable amount of deferred maintenance on some roads to be made good, and perhaps on other lines advantage will be taken of the opportunity to build some surplus strength into the properties, that is, to the extent permitted by scarcities of manpower and materials.

Conditions such as those prevailing at the present time are apt to result in a feeling of complacency regarding the future. But every thinking man knows that the conditions of comparative plenty now existing stem from the artificial stimulus that has been given the economy by the national defense program, and that when this "shot in the arm" wears off, as it surely will eventually, comparatively lean days will be with us again, and, with them, leaner appropriations for maintenance work.

It would be incorrect to assume that this view of the future implies a pessimistic outlook. Actually it is based merely on a recognition of the nature of our economy of which ups and downs of business activity seem to be an inherent characteristic, at least at the present time. Obviously, individuals can exercise no influence over these business cycles. This is not what is meant here in pointing to the danger of a complacent attitude during times of prosperity. The trouble with such an attitude on the part of maintenance men is that it is a stumbling block to action that would place them in a better position to carry out their responsibilities during troughs in the business cycle.

The action that they can and should take now is to intensify the search for methods, materials, devices and machines that will contribute to a reduction in maintenance costs. In fact this search should be in evidence if business were at a low ebb. Indeed, is this not the time to be trying new things when there is a little extra money available that may be used for experimentation, or to purchase and install materials or devices which, while costing more than those now in use, may produce substantial savings later on when the need for such savings may be much greater than it is now?

To suggest that maintenance men give more consideration now to the problem of reducing future maintenance costs is not to overlook the fact that they have many immediate and pressing matters clamoring for attention. The enlarged work programs that have been projected on most roads for the current year are going to absorb most of the time and energy of supervisory and administrative officers. But to use what little time and energy remain for some brass tacks thinking and planning for the future will eventually pay handsome rewards in the form of reduced costs.

SCRAP—

Has Again Become of Paramount Importance

STEEL mills have been operating their plants at capacity for several months, or at the rate of about 104 million tons annually. With the mill-expansion plans now underway, the rated annual capacity will rise to 112 million tons in 1952 and 120 million tons in 1953. Mountains of materials will be required to feed the hungry furnaces. Although the iron ore reserves of the Mesabi range are almost depleted, other sources in Venezuela and in Labrador are being developed. Hence, the supply of iron ore will not be a limiting factor in keeping the steel mills going at their full rated capacity.

On the other hand supplies of iron and steel scrap are shrinking at an alarming rate. This lowly, rusty material is required in almost the same quantities as pig iron in the manufacture of steel ingots. While the steel companies themselves comprise the largest single source of scrap, they depend upon outside sources for about 25 per cent of their requirements. And the railroads are normally the largest source of this outside scrap, contributing from 15 to 20 per cent of all scrap used, and the most desirable scrap for the making of greatly-needed alloy steels.

The full cooperation of all railroad employees, especially those in the maintenance department, is going to be required in locating and gathering scrap if the steel companies are to be able to run their plants at full capacity. A large amount of the railroad scrap comes from rail and fastenings released by the laying of heavier sections. The quantity of scrap material derived from a new rail-laying program and the succeeding released-rail program is said to be in the neighborhood of 70 per cent of the material used for the new rail program. To this extent the railroads may be said to be self-supporting in their use of steel, thus creating a forceful argument for securing new materials. But this percentage can only be realized by the gathering of **all** scrap from **all** relay jobs.

Also, scrap metal is to be found in small quantities all over the railroads, and includes not only track, bridge and water-service materials, but also metal dropped from cars and locomotives. In the aggregate these small quantities add up to a large tonnage. This material will not be picked up unless some systematic method is worked out to that end.

One of the most systematic methods of carrying out a scrap drive is simply to inculcate good housekeeping habits in the men to the end that each gang will police its work and gather scrap materials as well as unused materials at the end of each day's work. All too frequently not enough time is allowed by the foreman for this policing work, and as a result the gang leaves hurriedly to get home or avoid penalty time. Unfortunately, some foremen do not favor daily policing and plan to do such work before leaving the job. But, in the hurry of completing the project, they frequently leave before a complete clean-up is made. Picking up materials at the close of each day's work—whether it be an extra gang, section gang or bridge gang—not only insures a systematic method for salvaging materials before they get lost in the ballast or weeds, but also induces other habits of good housekeeping.

EQUIPMENT CARE—

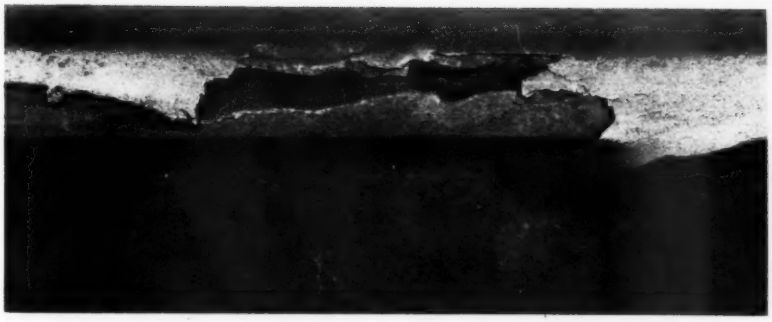
Must Be Better Than Ever

THE BEST of care has never been too good for maintenance machines, but it is more essential now than ever. Without it during the present emergency, some equipment is sure to break down—perhaps "never no more to (run)". No one is able to say how long an adequate supply of spare parts will be available. Common sense indicates that if fewer parts are worn out by carelessness or inadequate maintenance, more will be available for replacements that may be sorely needed later by virtue of legitimate wear from hard, productive use.

How long the threatening international situation will last is unknown but it may be a long time. Thus, it behooves every maintenance officer to take all steps necessary to see that his machinery runs efficiently and safely as long as possible. One of the easiest and best ways of insuring that ideal is careful maintenance.

Railway supply companies are doing all they can to keep an adequate supply of repair parts on hand. In many instances that is more difficult than it would appear at first glance. For instance, how many persons know that the supplementary appropriations bill recently passed by Congress calls for $63 million in Army construction equipment procurement? And how many know that when the Army orders a new tractor, for example, the order includes an extra set of tracks, and an extra set of pistons, transmission gears, radiator and other parts? Think of what requirements like that can do to parts inventories.

Add to the Army's recently appropriated authorizations, the Navy's requirements and the total equipment output of the nation is hit hard. The manufacturers are capable of meeting even that high demand, but they ask the railroads' help. Some are even turning their advertisements to that theme. Other agencies have also taken up the cudgel in defense of better machine care. The American Automobile Association, for instance, with the endorsement of the National Production Authority, is urging car and truck owners to "Spring-clean" their radiators. Their statement said in part, "In 1950, some 35,000,000 lb. of critical materials, including copper and brass were consumed in repairing damage to radiators caused by neglect. With industrial mobilization gaining momentum every day, critical materials can be expected to become increasingly short supply. Care is one of the most important factors in avoiding unnecessary use of materials." Maintenance mechanics should take their cue from these warnings, and "baby" their machines.

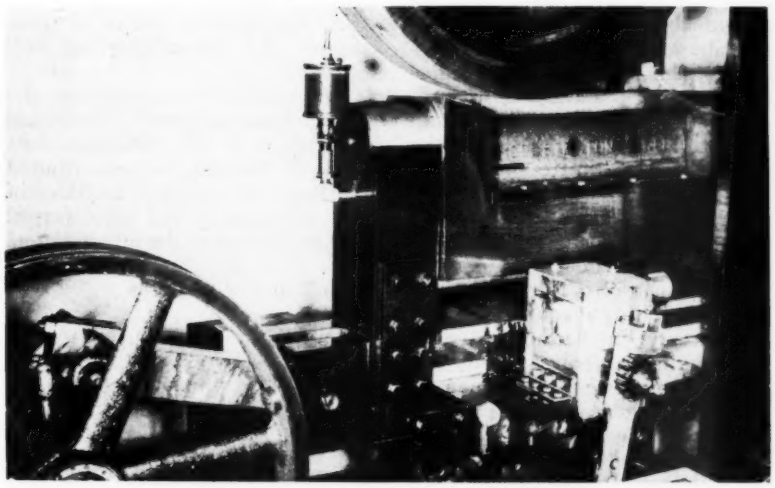


An example of shelly-rail condition that was produced in service

Research Attack on The Shelly-Rail Problem

By L. S. CRANE
Engineer of Tests, Southern System
Alexandria, Va.

The wide incidence of the rail defect known as "shelly spots" comprises one of the most perplexing rail-failure problems facing the railroads today. In an effort to find a remedy for this condition a large amount of research has been carried out on a broad front. The nature of this research and the results to date are discussed in this article, which is a reproduction of an address presented before the annual convention of the American Railway Engineering Association as a supplement to the report of the Committee on Rail.



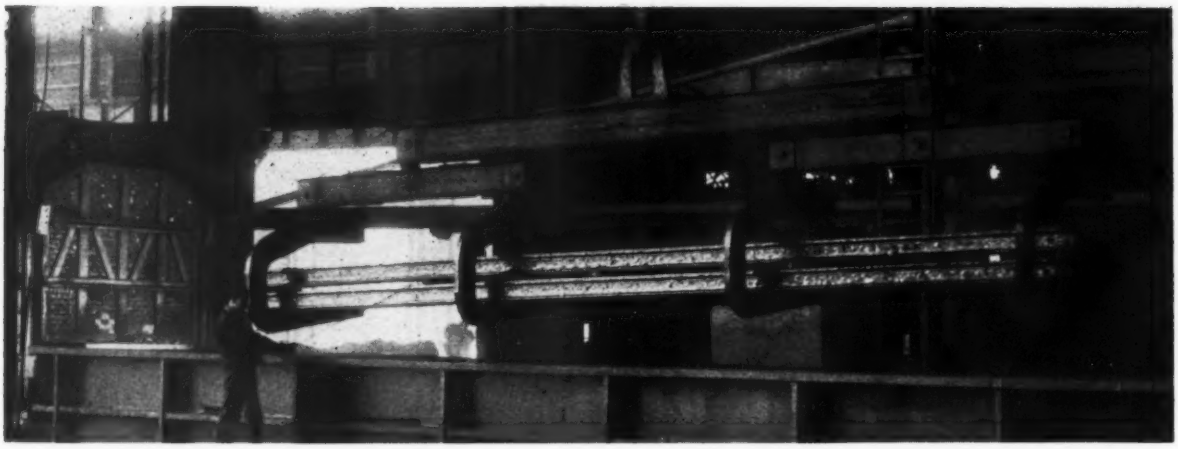
Machine developed at the University of Illinois for investigating shelly rail

Shelly spots in rails sometimes develop horizontal components that result in "detail fractures". Shown above are two examples of rails in which detail fractures from shelling occurred in service. All three photographs in this group were furnished by R. E. Cramer, special research associate professor of engineering materials, University of Illinois

• The long and arduous program of research work leading to the elimination of transverse fissures in rail steel was finished by 1938 and railway maintenance men were comforted by the thought that at last a steel free from defects had been developed and that, as increasing quantities of rail made from this steel were laid in track, premature failure of rail would become a thing of the past.

The Committee on Rail of the A.R.E.A. provided for a check on the quality of rail steel produced by requesting member roads to submit to the University of Illinois all samples of control-cooled rail which developed service failures classified as transverse fissures. The results of this continued examination, together with a yearly compilation of rail failure statistics, began to indicate that controlled cooling of rail was not a panacea for all the ills affecting rail steel. The statistics and the laboratory examinations revealed that failures in CC rail were occurring with increasing frequency within the joint-bar area as the result of high web stress. Also, failures were developing from the progression of engine burns and from the flaking and spalling on the gage corner of the rail.

Defects of the latter type were



The rails shown above are being heat treated at the Steelton plant of Bethlehem Steel Company for installation in track as an experiment to determine their increased resistance to shelling and to flow on the low side of curves

termed "shelly spots" and a new subcommittee of the Rail committee was formed in 1941 to investigate this type of failure—define it and develop measures for its prevention. Field inspection trips were made by the committee to familiarize all members with the problem. It was observed that the shelly spots were generally located on the top gage corner of high rails on curves, but that they also sometimes occurred on tangents. The defects first appear as dark spots on the running surface, which later develop into multiple cracks running longitudinally. Eventually pieces of the metal varying from 1 in. to 6 in. in length, ¼ in. to 1½ in. in width and ⅛ in. to ½ in. in depth, fall out of the gage side of the head. At times the cracks, instead of continuing in a longitudinal direction, turn transversely and cause the rail to break in two.

Metallurgical examination of the failed rails revealed the rail steel to be severely cold worked from the kneading action of the treads and flanges of car wheels. This cold working occurs to such an extent that the ductility of the rail steel apparently becomes exhausted, causing cracks to develop. These cracks progress under service loads, causing the longitudinal and transverse failures observed.

The committee organized its research work along three lines. The first consisted of studies which could be handled directly by the committee; the second covered studies to be handled by the research staff of the Engineering Division, Association of American Railroads; and the third concerned studies to be handled at the University of Illinois.

The committees' research studies established the fact that the tendency of rail to shell bares no relationship to its chemistry except as the chemistry affects the hardness of the running surface. A tabulation of curvature, elevations, speeds and grades for curves on which such defects developed failed to show any significant pattern. Although the onset of shelling could be retarded by slow cold working, thereby hardening the running surface, or by transposing rails from the high to the low sides on curves, these methods failed to offer a permanent solution to the problem.

Rolling-Load Tests

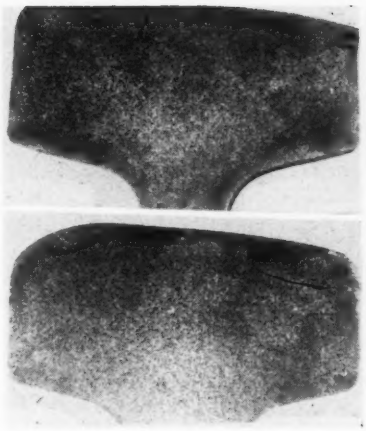
Meanwhile the University of Illinois had continued to make metallurgical examinations of shelly-rail specimens and had confirmed the original conclusion that the failures were caused by severe cold working of the gage corner of the rail. In an effort to reproduce this type of failure in the laboratory, the rolling-load machines, which had served the transverse fissure investigation so well, were modified to permit concentration of the wheel load along the gage corner of the test specimen. The machines were successful in reproducing gage-corner flaking and shelling on laboratory rail specimens, and demonstrated that the resistance of a given rail specimen to shelling was enhanced by an increase in hardness, tensile strength and ductility. This observation suggested to the committee that a solution to the problem might be achieved by (a) reducing the stress per unit area imposed on the rail steel by the wheel load, or (b) increasing the strength of the rail steel by heat treatment or by the addition of alloy elements.

In order to explore the potentialities of the first suggestion, the Engineering Division research staff initiated a program to determine the relationship between the contour of the wheel tread and the rail head. Worn rail contours were obtained on curved and on tangent track and these were compared with worn wheel contours obtained from 50-ton and 70-ton cars on several member roads. These studies indicated that improvement in the design of the gage-corner fillet might assist in reducing the tendency of the rail to shell by reducing the load imposed on the gage corner. This work has resulted in the improved gage corner design incorporated in the new 115-lb. through 155-lb. RE sections, and test installations have demonstrated the desirability of this change.

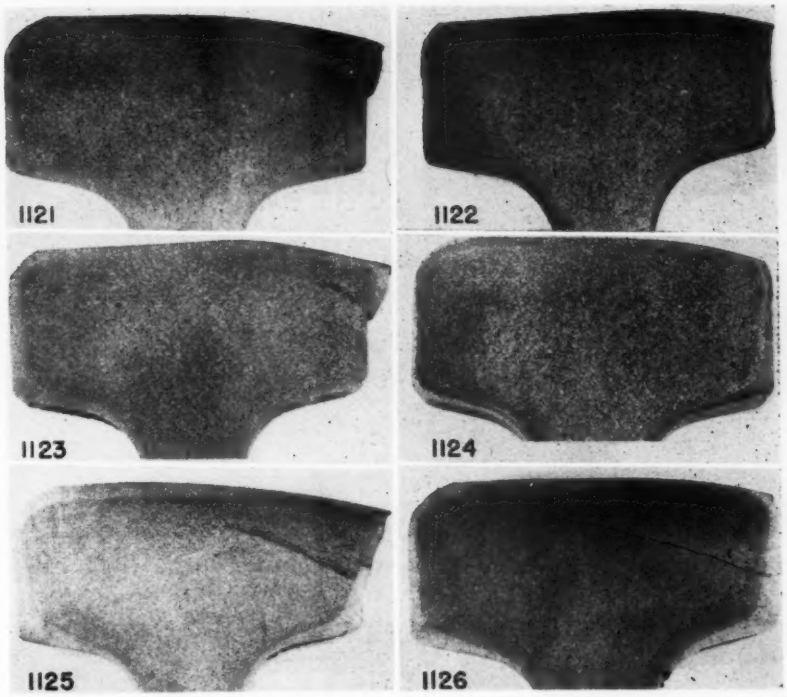
Throughout the investigation the Rail Manufacturers' Technical committee of the American Iron & Steel Institute has contributed the time, services, and facilities of that organization and has defrayed part of the cost of the investigation.

Two Types of Failures

In 1947 it was decided to employ the services of the Battelle Memorial Institute, a research organization of outstanding reputation in the metals field, to make a critical metallurgical survey of the shelly-rail problem as a supplement to a part of the work con-



Examples of two rails of alloy steel which were subjected to rolling-load tests at the University of Illinois. The top specimen ran 8,117,000 cycles before shelling cracks developed; the bottom specimen ran 5,027,000 cycles



Sections of three heat-treated and three as-rolled rails that were subjected to rolling-load tests. The results of the tests are given in the following tabulation

Rail No.	Heat treatment or as rolled	Classification of failure	Average Brinell hardness	Cycles in rolling machine
1121	As rolled	Shelling crack	273	900,000
1122	Quenched in oil and tempered	No failure	361	5,022,000
1123	As rolled	Shelling crack	267	1,206,000
1124	Quenched in oil and tempered	No failure	354	5,032,000
1125	As rolled	Shelling crack	266	1,667,000
1126	Quenched in oil and tempered	Shelling crack	366	3,232,000

ducted at the University of Illinois. The work at Battelle confirmed the results of the work conducted at the University of Illinois but amplified certain phases. In the course of Battelle's investigation several hundred rails were examined, both control-cooled and non-control cooled, which were collected from various member roads. The results of this investigation established the fact that two distinct types of failures are occurring.

The first of these is defined as "gage-corner shelling and flaking". This type of failure is characterized by components which lie in a horizontal plane and develop into horizontal fractures. The second type is defined as "detail fractures from shelling". These failures are characterized by having components which lie in both horizontal and vertical planes.

The metallurgical examination has indicated that "gage-corner shelling and flaking" failures are predominantly of surface origin, resulting from abnormal shearing stresses imposed on the gage corner of the rail by wheel loads. Battelle's investigators confirmed the previous suggestion that, if the wheel loads could not be reduced, the strength of the rail steel to resist these loads must be increased.

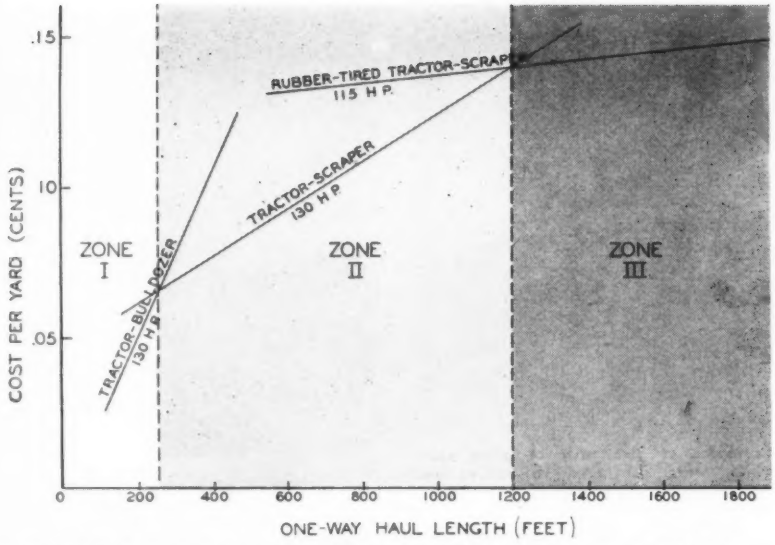
Two Promising Solutions

Two methods gave promise of achieving the desired increase in strength, one was to heat-treat normal rail steel, and the second was to develop an alloy steel with the desired physical properties. It was here that the representative companies of the A.I.S.I. provided invaluable assistance. One company had already developed and constructed heat-treating equipment for use in manufacturing heat-treated track work. This company arranged to produce some quantities of heat-treated rail with physical properties superior to normal rail steel. Preliminary, rolling-load tests indicated that these rails could be expected to offer superior resistance to shelling. Test installations of these heat-treated rails have been placed in tracks of several member roads where they are fulfilling the performance expected of them to date.

Another rail manufacturer undertook to develop an alloy steel rail. It was recognized that such a rail would have to be produced economically, thereby precluding the use of excessive or expensive alloy additions. Furthermore, the analysis would have to be adaptable to production under conditions of normal open-hearth, and rail-mill practice. This posed a difficult problem and over 350 experimental heats were produced before an analysis meeting these requirements was developed.

Rolling-load tests of the proposed alloy rail were run and again the results were promising. Since that time small quantities of these rails have been installed in tracks of member roads to permit their performance under service conditions to be observed.

It is not believed, however, that heat-treated or alloy-steel rail will provide a complete and satisfactory answer to the shelly-rail problem, since their use is barred by economic considerations in many cases. The Rails committee has, therefore, pressed its investigations into the fundamental aspects causing the mechanism of this type of failure with the hope of finding some economical solution.



In the case represented by the chart, hauls up to 250 ft. long would be made most cheaply by bulldozer (left). Hauls 250 ft. to . . .

For Effectiveness— "Zone" Your Earthmovers

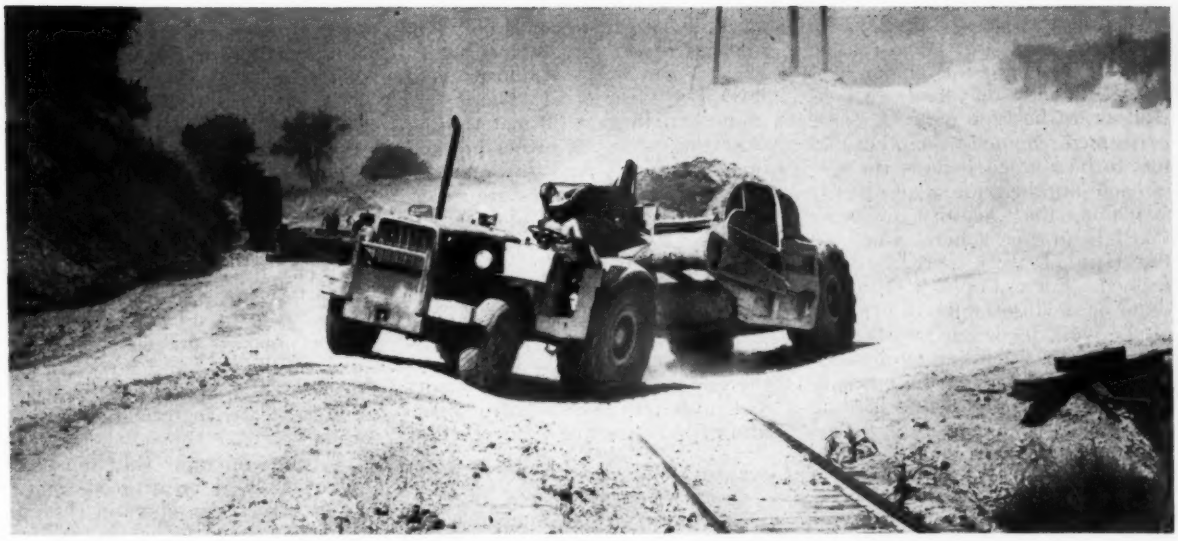
By F. E. SCHAUMBURG
Railroad Representative, Caterpillar Tractor Company

Three general zones of earthmoving are recognized. Each has certain distinct requirements for which only one type of equipment is most suitable. For the greatest economy a machine should be assigned, if practicable, to operate in the zone for which it is best suited

• Many factors are involved in determining the economical haul lengths for earthmoving equipment. Basically, however, experience has resolved most of them into an average cost of moving one yard of material various distances by means of each type of equipment. Having reduced the cost of ownership and operation of earthmovers to such a common denominator, the information can be plotted in the form of a graph such as that reproduced above.

With such a visual aid, it is rel-

This article was originally prepared as an answer to the question "What is the maximum distance bulldozers can push material economically?" which was discussed in the "What's the Answer" department of the March issue.



. . . 1200 ft. long would be handled by tractor-scraper (below chart), and more than 1200 ft. long by a rubber-tired rig (above)

atively simple to make a tentative selection of the type of equipment most economically suited to any specific job. The first selection must be considered tentative because the graph represents a hypothetical case involving average conditions. Final selection of the right equipment can then be made after considering the specific characteristics of individual types of equipment with reference to the details of the work to be done. In making this analysis, an experienced user of earthmoving equipment is guided by a few basic facts. One of these is that earthmovers either operate on tracks or on rubber. Each of these types has advantages and abilities that make it particularly adaptable to certain kinds of work. For instance, where ground conditions permit, and where hauls are sufficiently long to allow the use of a high average haul-and-return speed, wheel-type, rubber-tired tractors have an advantage. Where maximum power at slow speeds is required, track-type tractors have the advantage.

Zone Characteristics

In a similar manner, certain working areas can be classified in accordance with their equipment requirements. Generally these can be called: (1) The power area; (2) the slow-speed hauling area; and (3) the high-speed hauling area. These conform to the zones of the same number on the chart

In the power area, or Zone I, maximum power is required and job conditions enforce slow speeds. The categories of work normally performed in this area may include land clearing and grubbing, pioneering, structure demolition, crane-and-boom work, ripping or rooting, short-haul excavation or bulldozing, and pusher loading of scrapers. Such work is normally accomplished within a small area where speed cannot be applied. The very nature of the work is such as to require equipment capable of developing a high drawbar pull (or push) at slow speeds. Ground conditions are frequently poor and grades are often steep. Under such conditions, the traction of the track-type tractor permits it to use effectively a high percentage of its drawbar pull, thereby making maximum use of its available horsepower.

The slow-speed hauling area, or Zone II, is similar to the first in that power, rather than speed, is the essential factor. However, distances are considerably greater and require the use of carrying-type equipment such as scrapers or wagons for economical results. This zone is characterized by large loads which are pulled at slow speeds because of poor ground conditions and medium or short-haul distances.

In the high-speed hauling area, Zone III, where hauls are long and hauling conditions favorable, the wheel-type tractor has an important advantage—that of speed—not provided in the track-type tractor unit. Because of their speed, pneumatic-tired units are capable of maintaining, on longer hauls, production previously considered possible only on short-haul work.

Excellent yardage output is also possible with this type of equipment on shorter hauls, but at a cost generally in excess of that obtained by a track-type tractor-scraper combination. However, to maintain high-production yardage with rubber-tired tractors, conditions must be favorable, that is, hauling distances must be sufficiently great to permit the attainment of high average speeds; hauling conditions must be good, both as to grades and traveling surfaces, whether they be on the road, in the cut or on the fill; and pusher loading of scrapers is necessary to obtain economical loads because rubber-tired units are not capable of efficient self-loading.

Areas May Overlap

Some overlapping exists between Zones I and II, and between Zones II and III. In practice no definite lines to fit all circumstances can be established between zones because each specific case must be handled on its own merits. In some cases materials can best be moved by bulldozers beyond the limitations of Zone I, because ground conditions do not permit rapid travel. In other cases the number of units available may be so small that a pusher tractor cannot be used economically.

This boils down to job analysis supplemented by a knowledge of

normal methods and conditions. In analyzing each job, consideration must be given to the amounts of long-haul and short-haul work as well as to the type of work to be performed. Some of the other factors to be studied include the size of each job, the equipment already available, the quantity of work that falls in each general zone, and the type of work normally performed. For example, if on a medium or small job only 10 per cent of the work lends itself to the use of rubber-tired hauling equipment, it would probably not be economical to invest in high-speed hauling equipment for that one job, or use such equipment, were it available. If, on the other hand, the project is sufficiently large or if future work of a similar nature is expected, investing in high-speed hauling units is justified.

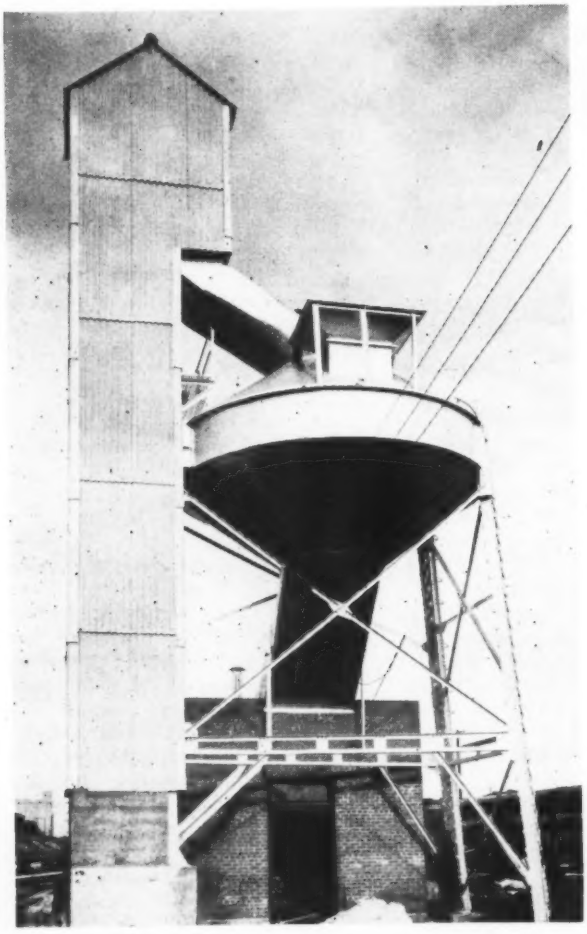
As can be seen from the chart, the area—Zone I—in which bulldozers are effective in comparison with other earthmovers is very limited. The primary factors which affect economical bulldozer haul distances include: (1) Grade; (2) ground conditions; (3) material; (4) operating cycle; (5) ownership and operating cost; and (6) operator skill. If adverse grades are excessive the economical-haul length is less than when the job is being carried out on the level. In dozing downhill, the economical haul length becomes greater. When ground conditions are rough, wet, or uneven, and tractive effort thereby unfavorable, the economical haul length is less than if operating conditions are good.

"Slot" Dozing

In handling stockpiled material "slot" dozing can usually increase the economical haul length beyond that obtainable when handling in-place material. With some materials, such as stockpiled sand, gravel or coal, economical bulldozing can be carried out to one-way haul distances of 350 ft. However, for average conditions in general, the economical one-way haul length is about 250 ft. as shown on the chart.

The total operating-cycle time limits the effective haul distance for each type of equipment in that it limits the number of trips and thus the yards handled per day. Thus, as the haul length increases it becomes more economical to pick up the load and carry the material at high speed than to try to bulldoze the material at a slow pace.

Finally, operator skill must not be overlooked on any equipment application. If an operator is familiar with his equipment, knows how to operate it, and knows its capacities and shortcomings, he can increase the economical haul length, whereas an unfamiliar operator will invariably reduce it.



Once a coal chute in Tennessee, now a sand chute in Missouri

Coal Chute Comes Out of "Mothballs"

• After keeping a 50-ton steel coal chute at Yale yards, Memphis, Tenn., in "mothballs" for 23 years, the St. Louis-San Francisco recently dismantled the structure, moved it to Springfield, Mo., and re-erected it there to serve as a sand chute. During its long period of idleness the chute was protected against deterioration by No-Ox-Id—a rust preventive manufactured by the Dearborn Chemical Company. As a result the rehabilitation of the structure required only the replacement of several plates.

The coal chute, an electrically-operated automatic unit manufactured by the Ogle Construction Company, was installed at Yale yards in 1927 at a time when the Frisco was planning to change coaling operations in connection with the establishment of through operation of locomotives between Kansas City, Mo., and Birmingham, Ala. However, this idea was abandoned almost immediately after the chute had been placed in service. Having thus no immediate use for the facility the road painted it with No-Ox-Id and left it idle with the thought that eventually a use might develop for it.

The structure was repainted with No-Ox-Id in 1943, and in 1946 it was again repainted, this time with No-Ox-Id on the inside and with black bridge paint on the outside.

No special problem was encountered in moving the structure to Springfield for use as a sand chute. It was simply dismantled, the parts placed in two gondola cars and shipped to Springfield. The structure as re-erected is exactly the same as the original structure except that the buckets used in hoisting the material from a hopper beneath the tracks were changed to carry sand instead of coal.

Test Effectiveness of Organic Synergists In Foam Control

This article is an abstract of an address presented before the Midwest Power Conference at Chicago in April. It describes and gives the results of laboratory experiments made to determine the value of certain organic substances in extending the "life" of antifoam compounds for boiler water.

By L. O. GUNDERSON and C. M. BODACH*

Observing antifoam test in experimental boiler in laboratory

• Tannins, waste sulfite liquors and certain other organic materials have long been of recognized value in the treatment of boiler feed water. "Organics" are known to be of definite value in the railway field for the prevention of boiler scale, for sludge conditioning, for oxygen removal, and for prevention of feed-line incrustation and of caustic embrittlement. Of these organic materials, no one in itself is considered to have any appreciable antifoam properties under the conditions used.

In relatively recent years the field of antifoam has been actively investigated and efficient long-lived organic antifoam agents have been developed. Certain polyamides have proved to be outstanding in this respect. Not only does the use of antifoams minimize the carryover problem but they increase boiler efficiency by permitting the carrying of higher boiler-water concentrations. These antifoam agents, however, are not uniformly efficient in all waters.

It has been found that tannins have a powerful synergistic effect when incorporated with polyamide antifoams. When indifferent results are obtained with polyamides alone, the addition of tannins greatly improved their antifoam efficiency. This improvement was accomplished in spite of the fact that tannins themselves have no significant antifoam properties.

Before the turn of the century, Dearborn was using tannins along with bodying agents in its castor oil antifoam formulas. In more recent years, W. L. Denman patented the use of tannins in conjunction with amine antifoams. Thus tannins have been in use as an adjunct to antifoams for many years. This synergistic action of tannins led to a series of experiments designed to clarify the role they played and to develop a working hypothesis for the mechanism involved.

It was thought that the reduced activity of antifoams in certain problem waters might be due to adsorption of the antifoam on the sludge and scale. To check this concept it was decided to inject antifoam which was pre-adsorbed on a synthetic sludge into an experimental boiler. For the preparation of this pre-adsorbed material, the techniques of chromotography were used. By the use of this technique the polyamide was totally adsorbed in a synthetic sludge and, by calculation, the desired amount of pre-adsorbed polyamide could be obtained for testing.

For test purposes in the laboratory boiler, a boiler water containing Na_2SO_4, Na_2CO_3 and $CaSO_4$ was

*Mr. Gunderson is assistant vice-president and Mr. Bodach is research chemist of the Dearborn Chemical Company, Chicago.

used (these salts were flushed into the boiler as such). Normally, polyamide works very efficiently in this water at a dosage of 0.2 p.p.m. and does not require a synergist.

A portion of the pre-adsorbed polyamide (calculated to contain 0.2 p.p.m. dosage) was flushed into the boiler. Very poor, short-lived effectiveness resulted. The subsequent introduction of chestnut extract caused the antifoam to become effective and long-lived.

A second boiler test was made under similar conditions. Fresh adsorbent material not carrying pre-adsorbed polyamide, as in the previous run, but equivalent in weight, was flushed into the boiler without any noticeable effect. Then a dosage of 0.2 p.p.m. polyamide was pumped into the boiler. The antifoam was very effective and long-lived.

Observations from Tests

These two tests are of value in arriving at a reasonable explanation of the mechanism involved. The following observations are important.

(a) Adsorbed antifoam is relatively ineffective.
(b) Certain organic materials release antifoam adsorbed on other substances, thus permitting the antifoams to act freely in counteracting foam formation.
(c) A similar action probably takes place in problem waters. The antifoam is made inoperative by adsorption on the sludge, and certain organics release the adsorbed antifoam.

If this reasoning is correct, then it follows that there are three fields of endeavor for increasing the effectiveness of antifoams in problem waters.

1. Changing the character of the sludge to prevent adsorption.
2. Changing the antifoam.
3. Finding more efficient organic synergists.

Approach No. 1 is of a limited nature since the inorganic chemicals commonly used, or feasible for use, in water treatment are relatively few.

The possibility of successfully changing the antifoam sufficiently so as to be non-adsorbent is relatively remote. By nature, the antifoams are polar compounds and thus would be likely to be adsorbed.

Laboratory Tests Undertaken

The search for more efficient synergists would appear to be the best approach. A series of laboratory boiler tests was determined upon to investigate these approaches. These tests were conducted in an experimental boiler.

One of the experiments was made with boiler water containing 395 p.p.m. $CaSO_4$, 2,000 p.p.m. Na_2CO_3, and 3,000 p.p.m. Na_2SO_4. A dosage of 0.2 p.p.m. polyamide (dissolved in alcohol) was slugged into the boiler. The water held solid and the "life" was 26 min. The addition of 100 p.p.m. of (powdered) chestnut extract did not extend the "life" of the antifoam in this type of water.

An experiment was made to determine the influence of calcium and magnesium hardness by using a boiler water containing 395 p.p.m. $CaSO_4$, 244 p.p.m. $MgSO_4$, 2,000 p.p.m. Na_2CO_3, and 3,000 p.p.m. Na_2SO_4. A dosage of 0.2 p.p.m. polyamide produced a short-lived effectiveness of only a few minutes. The subsequent addition of 100 p.p.m. of chestnut tannin extended the "life" to about 30 min.

An experiment with only magnesium hardness was carried out. The boiler water contained 244 p.p.m. $MgSO_4$, 2,000 p.p.m. Na_2CO_3, and 3,000 p.p.m. Na_2SO_4. With a dosage of 0.2 p.p.m. polyamide, the effectiveness was short-lived. The addition of 100 p.p.m. of chestnut tannin extended this "life".

These three experiments indicated that, of the two most common sludge and scale formers found in feed water, magnesium is most potent in reducing the effectiveness of amide antifoam.

Another facet of the problem was whether or not chestnut extract would have a sufficiently long "life" in itself as far as acting as a synergist is concerned. For this test, the following boiler water salts were used: 395 p.p.m. $CaSO_4$, 244 p.p.m. $MgSO_4$, 2,000 p.p.m. Na_2CO_3, and 3,000 p.p.m. Na_2SO_4. A dosage of 100 p.p.m. chestnut extract was flushed into the boiler and periodic steam drawoffs were made as in the regular tests. After an hour, 0.2 p.p.m. polyamide was pumped into the boiler. The "life" was about 21 min. Another addition of 100 p.p.m. chestnut tannin extended the "life" to 39 min. This would indicate that chestnut tannin has synergist "life". A third addition of 100 p.p.m. chestnut tannin had no additional effect.

Effect of Silicate

The presence of silicate was found to have a definite effect on antifoam "life". In a test to determine this effect the following boiler water salts were used: 395 p.p.m. $CaSO_4$, 244 p.p.m. $MgSO_4$, 2,000 p.p.m. Na_2CO_3, 3,000 p.p.m. Na_2SO_4, and 100 p.p.m. G. C. sodium silicate. A dosage of 0.2 p.p.m. polyamide had a "life" of 46 min. The silicate in this case might be regarded as an inorganic synergist. In reality, the silicate probable forms a different sludge having different adsorption characteristics.

A dosage of 100 p.p.m. trisodium phosphate was checked similarly to silicate. The phosphate did not extend the "life" of the polyamide. However, chestnut extract was effective in providing the increased "life".

Other organic materials were tested for synergistic action. Some of those found to be effective in a calcium-magnesium bearing water are starch, quebracho, sodium alginate and modified waste sulfite liquor.

These laboratory experiments have demonstrated that certain organic materials aid in the performance of antifoam; however, different waters, different sludges, and different forms of crystallization affect the power of adsorption, and this may result in different amounts and type of synergist required to obtain full effectiveness of the antifoam used.

Furthermore, organic material, either natural or from man-made contamination, may play an important part either as a synergist or a depressant. Identification of these materials will, in general, offer a major analytical problem. Obviously, even if all organic and inorganic constituents are known, it would not be practicable to boiler test all of these innumerable combinations.

The most practical means of solving the problem is to incorporate an organic synergist with the antifoam. This type of formula is effective in most cases. When indifferent results are obtained, even with a synergist included with the antifoam, supplemental organic material should be added and/or different synergists tried until proper adjustment is achieved.

With patience and proper supervision, waters which appear to be impossible to treat successfully can usually be effectively controlled by the proper organic synergist-antifoam combination. As a bonus, the other advantages attributed to a given organic material, such as sludge conditioning, may also be realized while it is being used, primarily, a as synergist.

Left—An Oxweld representative explaining an old-style acetylene manifold to a group of paint foremen on Soo Line

Below—Cleaning web of a girder with a blowpipe equipped with an 8-in. head

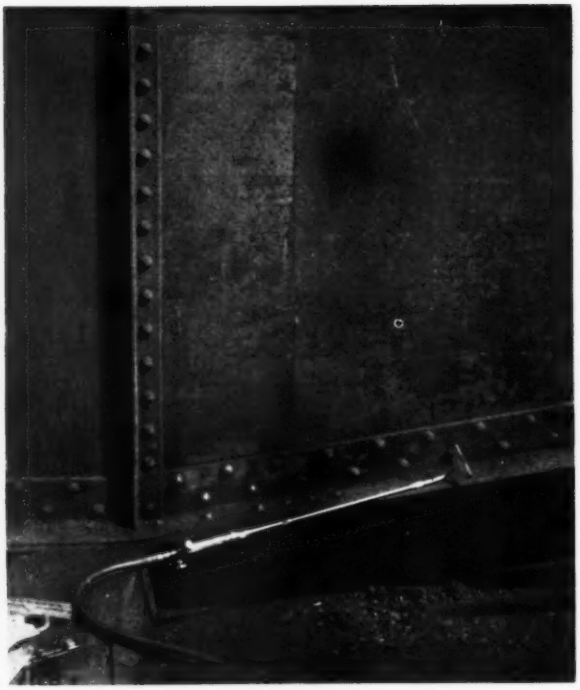
Instructions Give Proper Flame-Cleaning Techniques

This is the second part of an article on how to use the flame-cleaning process, which is based on instructions that were prepared by the Oxweld Railroad Service Division, Union Carbide & Carbon Corp., following a demonstration conducted for the benefit of paint foremen on the Soo Line. Part I, published last month, gave detailed instructions for setting up flame-cleaning equipment. Part II describes the procedure for doing the work.—Editor

A special cleaning head is used to remove the thick rust on bottom girder angles

Part II

• With all regulator adjustments and other arrangements completed in the manner described in the first article, the blowpipe and all sizes of flame-head assemblies should be taken to the point of use, it being desirable to have all heads available for immediate use where variations in the physical condition of the structure and in the size and contour of the areas to be processed may be encountered. To prevent loss and damage of the head assemblies not in use, it is suggested that means, such as slings or hangers, be provided to retain them in a location adjacent to the operation. Hose lines should be securely fastened and hung from the structure between the gas supply and point of usage in such a manner that they cannot be damaged and will not impose a load on the blowpipe operator or



After an area has been flame cleaned, a final wire brushing . . . . . leaves the surface of the steel primed and ready for . . .

hinder his movements on staging.

The type and design of the structure, the amount and character of the corrosion present and the condition of the paint film will, of course, be major factors in making the decision as to the extent of the cleaning or surface preparation required.

The flame-cleaning procedures in the following text cover the most efficient operation for specific conditions, but the judgment of the painter foreman in deciding which piece of apparatus is to be used for the assigned work must be exercised.

Heavy Rust Removal

Heavy rust growths usually are found in pockets, on the top sides of bottom girder angles, on horizontal lateral-bracing connecting plates, inside of latticed columns, in other locations not open to atmospheric ventilation, and wherever dirt, cinders or other matter accumulate and hold moisture which becomes corrosive from the absorption of air-borne contaminants.

Since these rust growths form in thick layers and contain a large amount of moisture, high-heat flames of medium velocity and arranged in line with comparatively narrow coverage are best suited for them. A 2-in. flame-cleaning head having the size of a No. 64 drill has been developed for this particular corrosion condition. This head is of such width as to permit free movement in pockets, around rivet heads in a horizontal plane, under rivet heads, in areas between rivets and legs of angles in a vertical plane, in structural-section joint corners, along edges of single or lapped-over plates, and in fillets of structural shapes such as angles, channels, H and I-beams and Z-bars.

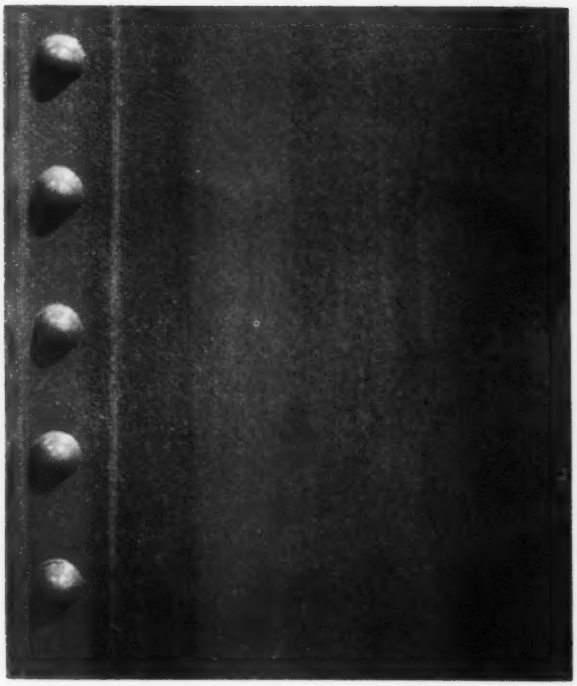
The cleaning operation should be performed by a two-man crew, with one blowpipe operator making all flame passes and a helper removing large accumulations of rust and performing a final wire brushing. The flame passes should be made progressively over the entire unit area. They should not be interrupted for touching up because subsequent passes will cover any "holidays" or deeply corroded spots and will thoroughly dehydrate and clean them.

Loose dirt and other matter should be brushed off the members to be cleaned before applying the flames to lift the rust. The 2-in. head should first be passed slowly over the heavily-rusted areas with the flames impinging on the rust at an angle of approximately 15 deg. If the area is rivet studded, the flame head should be maneuvered around the rivet heads as it progresses forward. The first pass of the flame should be made close to the free edge of the member and the succeeding passes made progressively away from this edge. A large amount of the rust will break loose during the first pass, with some of the top layers exploding due both to rapid expansion of the rust and to the steam pressure that is generated from the moisture in the rust.

After completion of the first pass of the flame, sharp blows from a flat-faced hammer on the structural member will loosen much of the rust close to the surface. All of this loosened material should then be swept away before making additional passes of the flame. The number of flame passes will, of course, be dependent upon the depth and formation of the rust. It is usual to find that pitting of such members has occurred, and it may be necessary to make an additional pass of the flames to remove all rust from the pit craters.

Dusting of the areas prior to the application of the primer coat should be performed by the painter, and his work should, of course, be scheduled so that the primer is applied to the surfaces while the metal is dry and warmer than the surrounding atmosphere.

. . . painting while it is still hot. The heat causes the paint . . .



. . . to flow easily and bake into a corrosion-resistant film

In many cases, although rust may not cover the entire area, a severe pitting condition will be found on members exposed to brine drippings, other corrosive liquids or where moisture was present on the surfaces when the paint or prime coat was originally applied. Since this condition indicates that all of the protective paint film is subject to failure induced by corrosion, it is recommended that members so afflicted be entirely stripped of paint and thoroughly flame-cleaned and primed. The depth of pitting will determine the size of the flame-cleaning parts to be used and, of course, the width of the affected areas will govern the width of head to be employed. The spherical shape of this form of corrosion deflects the flame to some extent and very little explosive action occurs in the rust formation. As it is desirable to remove all remaining paint film, the flame heads should be moved at a speed that will dehydrate the rust and soften the paint film. This speed can readily be determined by the operator.

Following the initial pass of the flame, scrapers or knives should be employed to remove the softened paint film and dislodge the rust from the pit craters. At least one finishing pass of the flame will be required to remove any remaining paint film and lift any remaining mill or furnace scale. The members should be thoroughly wire-brushed either mechanically or manually after the final pass of the flames and the primer coat applied while they are dry and warm.

Removing Paint Films

Blistered, alligatored or other unsatisfactory paint films can likewise be readily removed by the flame-cleaning process, either by completely burning or disintegrating the paint film and brushing, or by softening the paint and removing it by means of scrapers. Flame-cleaning heads having high-velocity flames, i. e., of No. 73 to No. 70-drill size, placed on close centers, should be employed for this operation and will be effective at comparatively high traversing speeds.

Under certain conditions, depending on such factors as the thickness of the members and their location, paint removal can be accomplished by applying the flames only to one side of the member and scraping the loosened paint from the opposite side. To strip paint from heavy-section members such as girder web plates, bottom and top girder angles, I-beams and H-columns, it is usually necessary to apply flames rapidly to both sides and follow immediately with scrapers or brushes. In removing paint from girder web plates, particularly, the flames should be traversed vertically and progressively over the entire height of the panels including the stiffener members, and should never be applied locally, for any reason, to any area of the web plate.

When a primer coat is found to be adhering tightly to the steel surface after removal of the cover coats, it is not necessary to remove the thin remaining film, but it should, of course, be thoroughly wire brushed after the final pass of the flames.

To remove all loosened mill scale, to disintegrate any remaining paint and to dehydrate the surfaces thoroughly, a final pass with high-velocity-flame heads should be made after the paint film has been removed. After the final pass of the flames, the surfaces should be thoroughly wire brushed and the primer coat applied while the steel is warm and dry.

Flame Priming

In flame priming new structural steel, flame heads that produce high-velocity, closely-spaced flames should be employed. Before using the flame on new material, any heavy deposits of grease or oil

On pitted members little explosive action occurs, and . . .

. . . putty knives must be used to strip paint completely off

should be washed away with solvents, as it is not desirable to burn this matter because a carbon deposit is produced.

After the surfaces have been given a solvent cleaning, the flame heads should be moved over them progressively at speeds consistent with obtaining complete dehydration of the surfaces and the lifting of mill or furnace scale. The correct speed at which this should be done will be quickly determined by the operator by observing the areas initially covered. Upon the completion of the flame pass, the surfaces should be thoroughly wire brushed and the primer coat applied by brushing. Any scale still adhering tightly to the surface after the passage of the flame can be safely coated since it will remain bonded to the steel if the primer is applied while the surface is warm and dry.

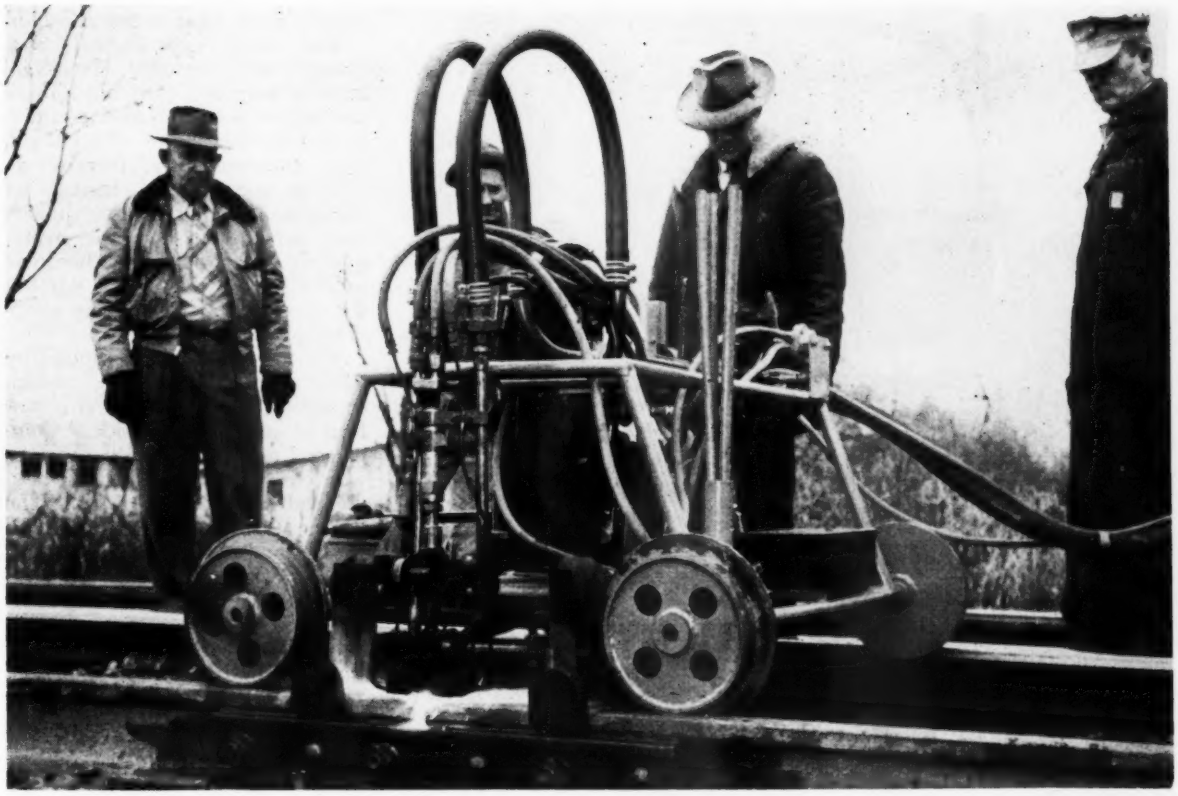
The specific flame-cleaning operations covered in the foregoing text will, of course, be required for parts of nearly all structures. By careful consideration on the part of the supervisor, good economical results can be obtained by combining the procedures and by completing all work in any given unit of the structure before starting other units.

Every precaution must be taken to prevent injury to the men employed and damage to the structures or other property. It is usually not necessary for men to wear protective goggles with colored lenses, but all men in the crew should wear clear-lens goggles. The use of dust-excluding respirators by the brush operators is desirable. Respirators that exclude noxious fumes must be worn by everyone when flames are used on lead or zinc-coated members in confined areas or in the open when adequate ventilation cannot be obtained. These respirators should be of the type approved by the individual railway safety department and should, of course, be used in accordance with existing rules and instructions.

Wire brushing can be performed with power machines for most wide, uninterrupted areas, but hand or manual brushing is required for areas inaccessible to the usual power-driven brushes. There are a variety of wire brushes manufactured for power brushing and the recommendations of the brush manufacturer or supplier should be followed. From experience it has been found that cup brushes, 6 in. in diameter, made from high strain music wire of .035-in. to .037-in. diameter with twisted bristles, give very good brushing service.

Hand brushes are manufactured in a number of shapes, but usually with only a single bristle gauge. Long or curved-handle brushes can be obtained in various widths from ⅜ in. to 1⅛ in., each having from 1 to 4 rows of bristles or wires. Shoe-handle brushes, either ⅝ in., ⅞ in. or 1 in. wide, with 2 to 4 rows of wires, are preferred by some users. In the event power brushing cannot be employed, solid-back hand brushes in a variety of sizes are manufactured for manual cleaning of large areas. These brushes are available in the following rectangular sizes: ⅞ in. by 4 in., 1¾ in. by 4½ in., and 2¼ in. by 7¼ in.

In addition to the primary use of oxyacetylene apparatus for flame cleaning and flame priming, it can be effectively used as a means of drying primed areas after rain, condensation or frost has wetted the surfaces, so that the cover coats can be applied without delay. By the use of flames for drying, painting can be started shortly after arrival at the site in the morning and can be continued through the day even though short thundershowers may occur. By providing dry, warm steel in this way, the use of flame-cleaning and priming processes also makes it possible to extend the effective painting seasons in most locations in the United States.



With this machine the Southern's goal is to field harden rail ends within the tolerance provided by A.R.E.A. specifications

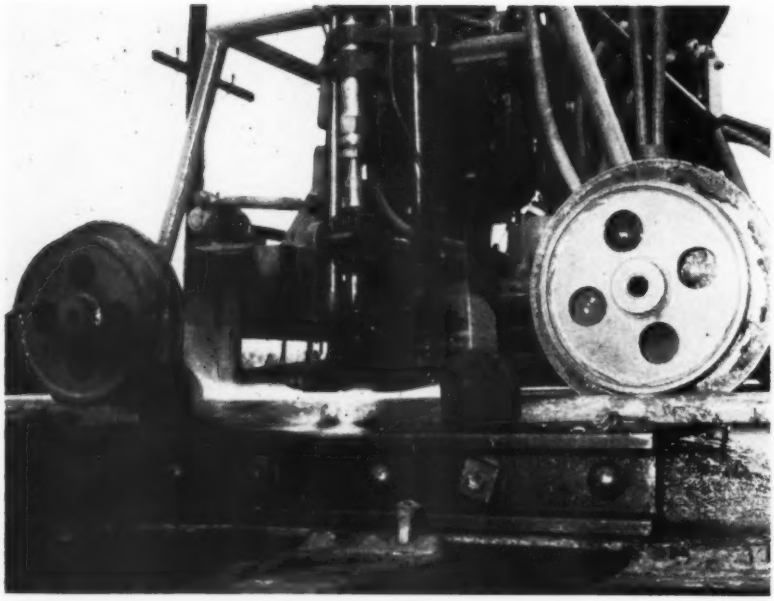
Machine for Hardening Rail Ends Developed on the Southern

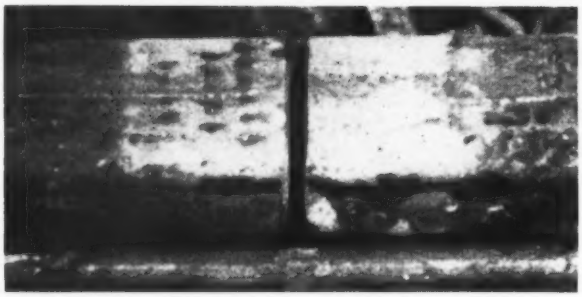
In collaboration with the Air Reduction Sales Company equipment has been devised on this road for end-hardening rails in track. This article explains why such equipment was considered necessary, and traces the steps and tests involved in its development. The results obtained and the capacity of the machine are also discussed.

• During World War II, the Southern System was experiencing difficulty in obtaining end-hardened rail from its suppliers. Some were not equipped to do mill hardening, while rail obtained from others varied widely in the range of hardness and in the hardness pattern. The road believed it could obtain better results from properly conducted field hardening of new rail and undertook to develop procedures that would give satisfactory and consistent results.

Working with representatives of the Air Reduction Sales Company, staff members from the railway's test department and various engineering officers and supervisors experimented first with a technique that involved the use of hand-held torches. Using a No. 12 tip, the operator heated a rail end to an eye-judged temperature of 1,650 deg. F. The heating was followed immediately with a water quench in which a measured quantity of water was sprinkled onto the heated area. This resulted in a hardness that was undesirably high and which had to be relieved by reheating to a temperature range between 600 and 700 deg. F. The reheat temperature was checked with an Alnor contact pyrometer (early tests were made with the thermal-point type which was later replaced with the platinum-disc type).

It soon became evident that this technique would not be satisfactory. Results varied widely depending on the tempering heats, and the severe water quench re-





Above — Adjacent rail ends are heated simultaneously

Left — Appearance of hardened rail ends before the passage of traffic

Below — Field testing finished work

sulted in cracking at the rail ends.

The next experimental step brought better results. Hand-held torches were still used but a dual-tip torch was employed which permitted the heating of adjacent rail ends simultaneously, thereby removing one of the elements of variation. A compressed-air quench was substituted for the water quench and produced a hardness within the desired range without the necessity for a reheating tempering operation.

The air quench was applied by using a quenching "box" which contained a baffle and had a pattern of holes in one side. Compressed air was fed into the box, was circulated by the baffle and escaped through the holes. The hardness obtained by this method was in the 325 to 350 B.H.N. range when a small-capacity compressor was used; the substitution of a 165 c.f.m. compressor raised the hardness to 350-400 B.H.N., which was considered more satisfactory. The air quench was more desirable, too, because rails were left on the "soft" side rather than the "hard" side as with the water quench. There was much less tendency toward cracking. Nevertheless, variations in hardness beyond a desirable range because of operators' inability to estimate and control the amount of initial heat input made it evident to the experimenters that they would have to go further in their work.

Machine Is Developed

The next step saw the beginning of the development of equipment that can now be said to be in its final "experimental" stages on the Southern. In August, 1949, L. S. Crane, engineer of tests of the road, described the prototype of the machine now in use. He wrote:

"The end-hardening machine consists of a small portable frame mounted on wheels, which is clamped to the rail by means of friction shoes actuated by an air piston. Heating the rail is accomplished by an Airco water-cooled heat-treating torch (style No. 4881) which has been modified to include two air-quenching heads located on either side of the head tip. The combined head tip and quenching head is reciprocated for a distance of two inches on either side of the joint by means of a reciprocating carriage driven by an air motor. Power from the air motor also drives a small port-

able pump and fan which is assembled with a radiator system to provide the necessary cooling water to keep the water-cooled tip in operation. A timber, a hot-spark ignition and an automatic oxygen and acetylene valve enable the tip to be operated with ease and the heating and quenching cycle to be accurately controlled. An additional air piston indexes the quenching head in the center of the joint simultaneously with the application of the quenching air."

L. C. McDowell of the Air Reduction Sales Company had built the original hand-operated experimental model at the company's Charlotte (N. C.) shop; Mr. Crane's description is of a machine that incorporated many changes resulting from an extensive series of field tests on the Southern. In addition, controlled laboratory tests were also conducted using the machine.

Based on the results obtained, the machine was reconstructed by Air Reduction and returned for further testing on the Southern near Cowpens, S. C. Again the experimenters found that they must make additional changes after accumulating further test data and using the machine under regular service conditions.

Further Tests Made

The unit was again tested on the Southern's Atlanta division near Hill City, Ga., where the pictures accompanying this article were made. In this test, which was made in double-track territory, the rail-end hardening unit was the advance element in a "train" consisting of section push cars on which were mounted the manifolded cylinders for oxygen and acetylene, a battery of compressed air reservoirs, and a high-capacity air compressor. A section motor car pushed the equipment as it advanced behind the rail-laying gang.

The Hill City tests indicated that steady progress was being made toward the goal of obtaining consistent and desirable results in field-hardening that would compare satisfactorily with hardnesses and consistency of hardness obtained in mill-hardening. Two additional programs are now under way; one to adapt the equipment for use by rail-laying gangs on single track, the other to deal individually with the variables that have been identified in the process itself.

Shown here observing results obtained with the machine in a test at Hill City, Ga., are (standing, left to right): J. E. Griffith, assistant chief engineer, Central Lines; G. H. Echols, chief engineer, Central Lines; J. R. Humphries, test department representative; J. G. Armstrong, track supervisor; and Rush Kelso, division engineer, Atlanta division. Kneeling is F. J. Bolda, metallurgist, taking a Brinell hardness reading

It is expected that the first problem will be worked out by using a tractor-mounted compressor and other off-track equipment, with only the rail-end-hardening unit on the track. It is light enough that it can be easily removed when the track must be cleared.

The Southern's yard at Alexandria, Va., close to the road's test department facilities in that city, will be the scene of additional experiments in which Mr. McDowell of the Air Reduction Company and the Southern's test engineers will cooperate. This setup will allow the results obtained in field testing to be checked closely by the use of complete laboratory facilities. Further work will be done to study the temperature to which rail should be heated; length of air quench; volume of air required for quenching; effect of weather, including both temperature and humidity variations; and differences in the rails themselves.

Although the field tests so far conducted have been made in conjunction with regular rail-laying projects, only rough estimates can be made of the work-volume capacity of the unit under test. It does appear, according to those who have been on the project since the beginning, that the machine finally developed will be able to keep pace with a rail-laying gang working in single-track territory; on double track, where laying can go ahead more rapidly, the use of two machines may be required or it may be necessary to provide for a slight "lag" in end-hardening. That, however, like the total number of men required (three appears to be a minimum—a welder, welder helper and tractor or motor-car operator), is a problem that the experimenters are willing to leave to those who will use the machines.

In the meantime, the Southern and Air Reduction Company will continue to concentrate their efforts on stabilizing procedures that will give the desired degree of hardness—every time—to the small area at the end of each rail where hardness is needed. They have been interested for a number of years in the three inches of ball surface at the end of each rail. It is desired that the hardness penetration to be about ¼ in. on each rail. The goal of having each hardened end fall within the limited tolerance provided by A.R.E.A. specifications is being persistently pursued.

After marking the stud locations with a drill and template . . .

. . . the studs are end welded in place by a special welding gun

Welded Fasteners for Roofing

• A relatively new way of applying roofing and siding materials, by which building contractors are reported to be effecting savings of 25 to 60 per cent as compared with older methods, is being widely used by designers and fabricators of railway buildings. To date this method has been used to fasten corrugated asbestos siding to shops, corrugated metal roofing to miscellaneous buildings, corrugated aluminum siding to freight stations and flat asbestos sheets to interior ceilings of passenger stations.

Developed by the Nelson Stud Welding division of Morton-Gregory Corporation, Lorain, Ohio, this method is basically an electric arc-welding process for the end-welding of studs, or almost any other kind of fastener, to steel surfaces. The fundamental operating principle of this process is to establish and control automatically a shielded electric arc between a stud or fastener and the surface to which it is to be welded. The simplicity with which this can be done by the Nelweld method, as it is called, is one of the features of the process.

The application of the Nelweld method involves the use of four specially designed devices. One of these is a portable, lightweight, electric-arc welding gun that can be used in any position and can be operated on current furnished by a standard d.c. welding generator. Another is a special timing device used to control the length of the weld cycle. The third is the threaded stud or fastener itself, the welding end of which is loaded with flux. The fourth is an expendable ceramic ferrule that fits over each stud to shield and confine the arc, to control the weld fillet and to minimize splatter.

To weld a fastener to a steel surface requires only that the stud position be marked by the use of a template or punch mark, that a stud and its protective ferrule be chucked into the welding gun, and that the gun be pressed to the surface and the trigger pulled. With the pulling of the trigger, the welding-current circuit is completed and a solenoid within the gun lifts the stud about 1/16 in. from the work, creating an arc between the stud and the building-frame member. After the correct amount of time has passed, as predetermined by the size of the stud being used, the adjustable timer-control unit automatically shuts off the welding current and the stud is plunged into the pool of molten metal created by the intense heat of the arc. Once the trigger is pulled, the entire operation is automatic and the weld is completed in a fraction of a second, which, under normal circumstances, makes it possible to end-weld as many as five or six studs every minute.

Applying Roofing

In using this method for the application of corrugated metal roofing, for instance, the welder first shoots rivet-type studs through a template in position on the steel purlins. An extension at the rivet end of each stud has a smaller diameter than the shank. When enough studs are in place, a member of the installation crew places a corrugated sheet in position, and a sheet-

Studs in position for the next corrugated aluminum sheet

Special studs, welded "quick as a flash" to the steel framework of buildings by a lightweight, automatic welding gun, provide a novel and economical means of installing roofing and siding of many types, including corrugated metal or asbestos, steel, and aluminum.

When sheet is in position, each stud extension is drawn through corrugation crown by striking the metal with a rubber hammer

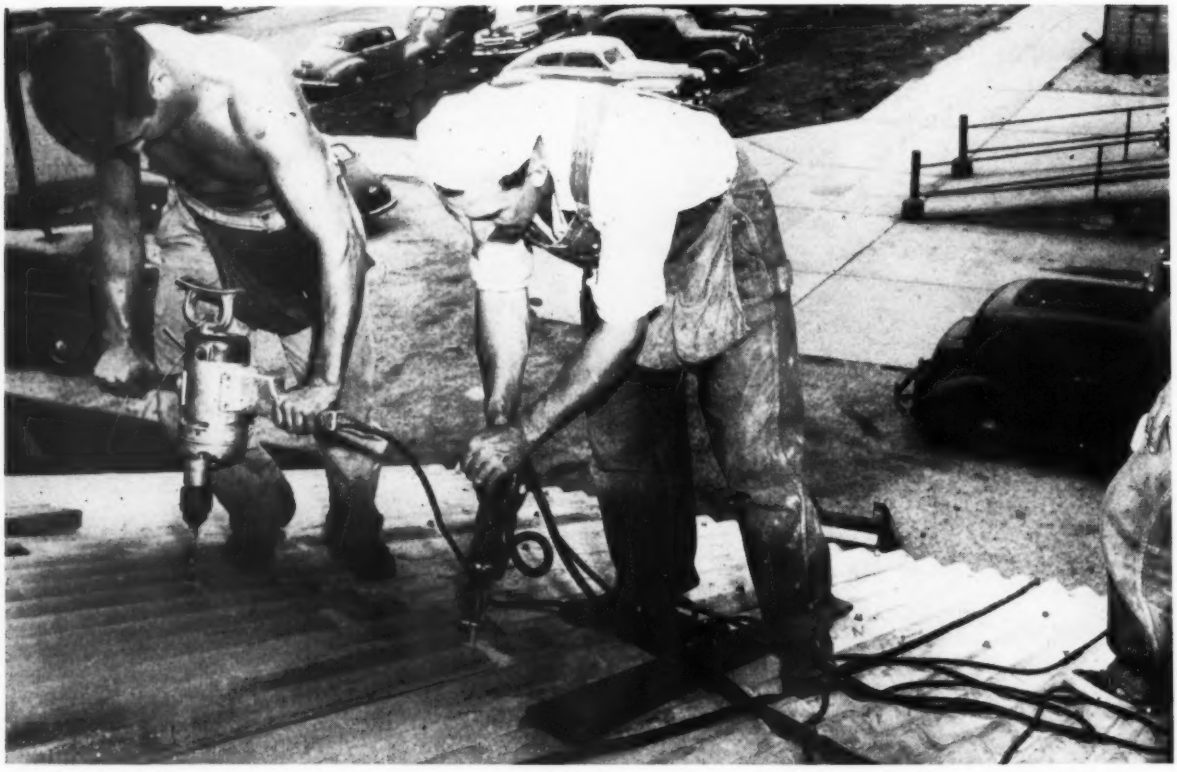
and Siding

er drives the rivet extensions through the corrugation crown by striking the metal with a rubber hammer at each stud location. Each stud head is then upset with a rivet set and rounded off with a hammer. In this way the corrugated-metal roofing is neither torn nor damaged, and the rounding off of each rivet provides a weather-tight fastening.

In adapting this method to the installation of corrugated aluminum roofing and siding to a steel-frame building, a special problem arises in connection with corrosion which might be caused by electrolytic action between the dissimilar metals—aluminum and steel—in contact. To solve this problem a special stud has been designed, which is made up of a cadmium-plated, flux-filled mild steel base or body and an aluminum insert. This composite stud has a shoulder on which the ridges of the corrugated aluminum roofing can rest. When these studs have been welded in place, their shoulders are high enough to hold the corrugated aluminum 1/16 in. off the purlins. Thus, with an aluminum washer placed over the stud before the latter is riveted, the corrugated aluminum touches only the aluminum insert of the stud and is shielded from the steel purlins by the cadmium-plated, mild-steel base. This construction, with aluminum against aluminum and steel against steel, is said to hold to the minimum the possibility of corrosion due to electrolytic action.

The ease and simplicity of the stud-welding operation is said to have resulted in significant cost reductions over conventional strap-and-rivet or clip-fasten-

Each stud head is then riveted with a rivet set and hammer



To apply asbestos roofing, holes are drilled through sheets, threaded studs are welded to purlins, and sheets are fastened by nuts

ing techniques. In a recent application it was reported that a four-man crew fastened 35 squares of corrugated aluminum in a 6-hr. day. Cost reductions ranging as high as 64 per cent are said to have been effected in applying roofing and siding materials with the Nelson stud welder. In applying steel roof decks, where a four-man crew is used on tack-welded jobs, as well as those that are stud welded, the ease of application by the latter method is claimed to enable the men to place 30 squares a day instead of only 18 by tack welding.

One of the advantages of stud welding is the elimination of the need for any inside scaffolding. This is particularly helpful for maintenance or replacement work since it will not affect any operations that may be going on inside the building. Nor are outside working platforms required when stud welding is used for fastening roofing materials, because the crew works directly on the surface being covered.

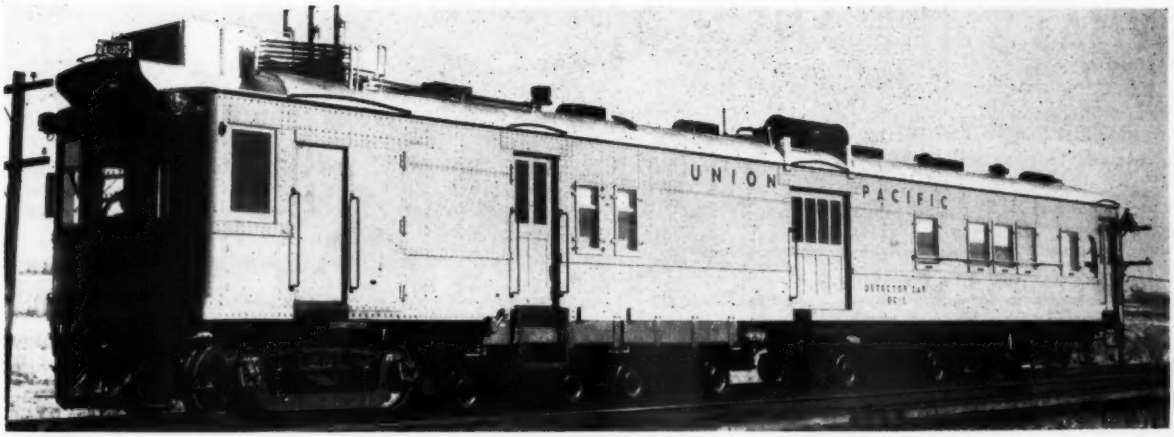
New Power Units Available

The recent introduction of two new power sources has further improved the efficiency of the Nelweld method of fastening. One of these is a self-contained battery unit which provides a reliable source of welding power at any location. This unit consists of twelve 6-volt, 150-amp., wet storage batteries mounted on a frame. No external connections are needed, and when necessary the batteries can be re-charged through a 100-volt unit mounted on the battery frame. The other power source is a motor-generator set specially designed for stud-welding use. This generator runs at high speed, and while it delivers current equivalent to two 400-amp. units, often needed heretofore in parallel, it is fitted into a frame no larger than that of a 200-amp. motor-generator set. With these power sources, the versatility of the stud-welding method is limited only by the ingenuity of engineers in designing studs or fasteners to use with the guns.

Special Studs

For use in railway biuldings, in addition to the "Rivweld" stud designed for applying corrugated aluminum, many other special studs are already available. With plain studs, wood furring or nailing strips and heavy decking and planking can be readily fastened to steel purlins or beams. Special zinc nuts and soft lead washers can be provided for application to a threaded stud for fastening corrugated asbestos roofing and siding. Short studs and clips can be used to secure electric conduits, pipe or fittings to steel beams or columns. For suspending pipes of large dimensions from ceilings or other supports, female studs are available into which pipe-hanger rods can be threaded. For this latter purpose an extension can even be applied to the welding gun so the operation can be carried out by a person standing on the floor. To make these welded fasteners as easy as possible to secure, building-material suppliers are reported to be planning to furnish Nelson studs when filling material orders.

Finally, although this welded-fastener technique involves the use of a considerable amount of metal, government control of which is already in force, it is reported to require considerably less than normal fastening methods. For instance each stud-welded fastener uses only 2 in. of ¼-in. rod instead of 4 in. required for each fastening used in normal methods of securing corrugated roofing to steel purlins.



With this new detector car, and three others of a different type, the Union Pacific tests the rail in its main line every 45 days

Union Pacific Gets New Detector Car

• The Union Pacific has built a new detector car which locates rail defects with special magnetic equipment furnished by Teledetector, Inc., Chicago. The road reports that, in preliminary tests, the car gave excellent results, particularly in locating defects in those sections of rails adjacent to and within the limits of joint bars.

Briefly, here is how the car operates. As it moves along at a testing speed of about 8 m.p.h., electromagnets magnetize both rails. Defects in the rails cause distortions in the magnetic fields thus formed. All such distortions are detected by pick-up coils which amplify the irregularities and relay them to a series of pens on a moving paper tape located inside the rear of the car.

The electromagnets are carried on three separate trucks, two behind the leading truck of the car and one ahead of the car's rear truck. Those carried on the latter truck are known as the main magnets. All the magnets operate in a position about 1/16 in. above the tops of the rails. Each pick-up coil is mounted within the rear truck of the car and moves over the rail on a carriage consisting of small rollers. Mounted on this truck also, just ahead of the pick-up coils, is a "surface growler" for each rail, which demagnetizes the top 1/16 in. of the rail to cancel any inconsequential surface indications which may be picked up by the coils. Another set of "growlers" behind the pick-up coils substantially demagnetize the rails after the car has passed along. The wheels of the three magnet trucks are about half the size of conventional car wheels and are made of stainless steel to minimize wear and to repel the magnetism to which they are exposed.

Five Recording Pens for Each Rail

Actually, the pick-up coil for each rail is a "shoe" enclosing five separate coils. One of these is a coil of low sensitivity which indicates the rail joints only. The other four are positioned laterally across the rail in such a way that each covers a separate channel in the rail. Each of the five coils activates a separate recording pen.

When a defect is noted by one of the pens, a paint gun attached to the carriage of the corresponding pick-up coil marks the location of the defect. The operator, who is stationed at the rear of the car, evaluates the indication on the tape and makes a visual check of the rail. If he believes it necessary, the car is halted for a hand test.

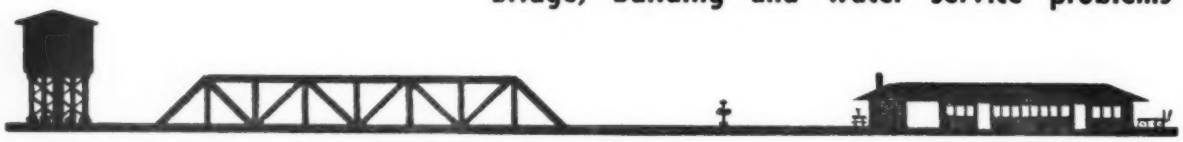
The operator is stationed at the rear of the car where he can watch both the moving tape and the rails passed over by the car

In making the hand test a bar is lowered by an air cylinder to contact the rail on the car side of the defect indication and an electrical connection to the rail on the other side of the indication is made by a cable. A current of 1,500 amp. is then passed through the rail between the bar and the cable connection and the contacts of a hand-test meter are passed along the rail surface. From the meter reactions, the location and extent of the defect can be determined accurately.

The car is equipped with sleeping quarters for the crew, a shower, a kitchen, dining facilities and a work shop. It is propelled by a 275-hp. Winton gasoline engine. The generators which produce the current for operating the testing apparatus are powered by a separate 100-hp. Hercules engine.

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems



Use of Autos by Supervisory Men

Under what circumstances, if any, should division engineers, supervisors, roadmasters, or other supervisory personnel, make use of automobiles in lieu of track motor cars or trains in the performance of their duties? Explain.

Limit Their Use

By E. H. BARNHART
Division Engineer, Baltimore & Ohio, Garrett, Ind.

The use of automobiles by supervisory personnel must be very carefully considered regardless of whether the cars are furnished by the railroad or owned by the employees. There are times when division engineers, assistant division engineers, track supervisors and others can very economically use automobiles, but at other times motor cars are preferable.

Any difficulties that do arise from the use of autos generally stem from the mistaken belief that an automobile can be used for the same supervisory work as a motor car. Track supervisors in particular are likely to have this view. Quite often they will argue that they can get over their territories and see more of their foremen by the use of automobiles than by motor cars, particularly in view of the increasing restrictions being placed on the operation of the latter.

The times when a track supervisor is most justified in using his automobile is in case of derailments, storms, floods, or such other similar types of emergencies. Any restriction placed on the use of automobiles by track, signal and B. & B. supervisors should be handled very carefully. During the winter season it is quite necessary that supervisors use their automobiles oftener than during the "working" season, but this practice should not be abused. To detect bad track conditions which may not come to the attention of foremen, track supervisors should ride motor cars whenever weather conditions permit, in winter as well as during the working season.

The use of automobiles by B. & B. supervisors, division engineers and their assistants, can probably be more justified than can the use of automobiles by track supervisors. Although men in the former group are also charged with the responsibility of observing track conditions, their territories are usually so much more extensive than those of track supervisors that there is more justification for their using automobiles to supervise their gangs and personnel. This class of supervision, by virtue of the larger territory covered, must do it faster, and must, therefore, limit its use of motor cars to the amount of time they have available.

It is needless to say, however, that all types of division personnel in the M/W department should use motor cars whenever it is possible to do so. The automobile should be used only as supplementary transportation in emergency or when gangs are so widely separated that the use of a motor car would take too much time to get to them.

Autos Are Necessary

By C. J. MILLER
Assistant Roadmaster, Western Pacific, Elko, Nev.

This is a very timely subject and the following discussion expresses by own personal opinions which may not necessarily agree with the

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Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 79 W. Monroe St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In The July Issue

1. What is the best method of raising track about 4 in. on stone ballast, making tie renewals at the time the track is raised? Explain.

2. On the basis of actual experience, what is considered the normal life of corrugated asbestos-cement roofing and siding when used on buildings at mechanical terminals? At other locations? What can be done to increase the life of such material?

3. What precautions should be taken to prevent continuous-welded rail from "buckling" when it is being resurfaced or raised? Explain.

4. What type of construction for under-track openings is best suited for cattle passes? Explain.

5. Does it make any difference whether switch ties are renewed at the beginning of the working season, when it is in full swing, or near its close? What factors are involved?

6. What maintenance procedures should be followed in keeping cathodic protection in steel water tanks at its highest effectiveness? Explain.

policies of the railroad for which I work.

The railroad industry is very rapidly modernizing its operations, equipment and methods. Methods which were impractical a decade ago are now standard operating procedures. Many of these practices are "standard" today in spite of an automatic reflex action, on the part of those who decide such matters, to shy away from anything which might change our outlook—anything for which there was no precedent. Automobiles are just now graduating from the "unprecedented" class.

Each day trains are becoming longer, heavier, faster and greater in number, and getting them over the road is becoming more and more complicated. Therefore, we are changing over to CTC operations, we are eliminating unnecessary stops, and we are making the divisions longer. In short, we are doing everything possible to run our trains in a way that will act as a counter-punch to the competing highway traffic, and if we are to operate efficiently against such competition we must leave the rails as free as possible for the purpose originally intended—fast, heavy trains.

Under the present traffic conditions, motor-car operation is not only a hindrance to the train dispatcher and the supervisor trying to cover a 100-mile district, but is a cause of delay to large AFE or maintenance gangs. In many cases motor-car operation is actually dangerous. To those operating motor cars it is fast becoming an accomplishment to cover the district between daylight and dark without getting "hit"—and have time to give supervisory problems the attention they deserve.

There are some classes of motor-car operators, such as section or signal men in the "canyon" type of territory or other places where there are no roads of any sort, who cannot, at present, get away from motor cars. But, in my opinion, where roads are available, motor cars should be done away altogether.

The title "track supervisor", I have often been told, very definitely specifies that the man is a track supervisor and not a highway supervisor. That is correct, but why restrict him to a motor car when it is possible for him to accomplish more, and in less time, by automobile transportation? Several trips a week over a district on different classes of trains, plus a weekly motor car inspection trip, during which the roadmaster can issue instructions and discuss problems, should be sufficient. Track irregularities can be picked up better by riding the trains that are affected by these faults than by merely looking at a piece of track.

Again, not all of the modern roadmaster's duties consist of picking up rough spots in the track structure. He is also held responsible for such things as investigating accidents, handling minor labor-relation problems, contacting land owners along his portion of the right of way, delivering items of all description to his own forces and others along his district, checking roadway machinery repairs and operations both in the field and the shop, and directing AFE projects. These and a great many other such chores are duties which sometime take more time than can well be afforded. If the roadmaster is restricted to riding a motor car only, he can probably handle no more than one such problem on any one trip. It is probable, too, that he will not have time to handle even that one problem with the detail that it deserves. Some responsibilities might require his entire day without time for dodging trains on a motor car.

There are many times when it is to the advantage of all concerned if the officer can retrace his tracks to complete some detail. With an automobile this can be done. On a motor car it is impracticable, and sometimes impossible, to do so. With an automobile a supervisor can shuffle back and forth, covering several important problems the same day, without the worry of trains or the delay of waiting for them. Finally, from the use of autos the company will benefit greatly by the supervisor's increased time on the job.

There are other reasons for motor cars being used as little as possible. The greater number of trains, all of them faster and heavier than ever before, that are using the rails today increase the possibility of a collision between a train and a motor car or else result in much longer days for the motor-car operator and less benefit from his services. These two items, of course, are inversely proportional to one another, but the net result is important. Work days of supervisors are becoming longer, with the consequence that the morale of monthly-rated track and signal supervisors is becoming lower and lower. That, above all, is the most important reason for allowing supervisory officers a freer and more pleasant method of completing a day's work. It is my opinion that the authorized use of an automobile would increase the roadmaster's efficiency, decrease his occupational hazard, shorten his day and strengthen his morale.

Improving the Quality of Safety Signs

How can types of safety signs now commonly in use be improved so that they will continue to attract the attention of persons who work daily in their vicinity? Explain.

Prepare Signs Carefully

By E. H. Blewer
Assistant Superintendent of Safety, New York Central System, New York

Safety signs and posters are effective weapons in fighting accidents today. They provide a means of getting short safety messages across to a great number of people. However, the many factors involved need to be thoroughly thought out before placing these signs and posters if the maximum benefits are to be obtained. Unless enough attention is paid to these details the result will be "just another sign or poster."

The first requisite is to have a prominent posting place, such as an easily visible, attractive bulletin board. Prominence can be obtained by placing it where men congregate or pass by sometime during the hours of their employment. These boards can be lighted or unlighted depending on their location and visibility. They should be at eye level. They should be designed to fit the posters that will be used. Material posted on them should be well arranged, kept orderly and up to date. Flashing electrical boards are very effective but should be kept very simple so they can be easily under-

stood. Electrical boards that are complicated and have to be studied to get the message lose their value after a short time.

The posters and signs used should be educational, colorful and be beamed to carry a simple message or thought. They should be changed at intervals. Simplicity again is the rule. Lettering on them should be large enough to be read easily at a distance. Colors, when used, should be skillfully chosen to highlight the particular point to be emphasized. Wording should be reduced to the minimum. Humor should be interspersed with seriousness in a run of different posters. The use of cartoons in this connection is good. The large, billboard type of safety poster is effective at entrances to shops and other work places. Employee participation in sketches and slogans for posters is stimulating and keeps men looking for their ideas on the bulletin boards. Giving proper credit to the employee responsible for the material used in such instances adds to the worth of the posters.

Safety signs and posters will do a good job but it is vitally necessary that their preparation and placing be given a great deal of thought. They are tools of safety and their benefit in accident prevention can be measured.

Vary Signs to Get Attention

By H. M. HARLOW
Assistant General Supervisor Bridges & Buildings, Chesapeake & Ohio, Richmond, Va.

A safety sign is effective only as long as it is visible and attracts the attention of the person or persons whose safety is to be protected. The location, colors, wording and shape of the sign are four factors that affect the visibility and the power of the sign to attract attention, and thus influence the course of action of the observer.

The sign must be located where it will be readily noticed. However, by remaining in one specific location for too long a time, a sign can become so much a part of the immediate environment that it no longer effectively attracts the attention of those most familiar with the particular vicinity. Varying the location of a sign in or on buildings, even slightly, will help to make it more noticeable. Changes of only a foot or two to either side, or above or below the old location, will help to accomplish this. Complete changes of location will, of course, be equally effective—provided of course that the new location is passed by as many employees as the old.

The colors for safety signs are more or less standard, but at least two are always involved. A complete change in colors every now and then will help to make them more noticeable, if the new colors attract the eye. Reversing the background and letter colors will produce the same effect. Since signs must be repainted periodically, this reversal could be made a part of the repainting procedure at little, if any, extra expense. Various methods of reflectorizing signs, now available, add to visibility at night and are being adopted.

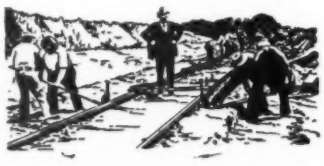
Variations in wording a sign also help to renew its attracting power. This too could be made a part of the repainting procedure. To influence the action of an observer a sign's message must be provocative of thought. The message can be varied in many ways with the same basic thought and stimulus behind it.

The shape of the sign is important and has a great deal of influence on its attractiveness. Good balance between width and length of a rectangular sign is desirable as it affects the letter size and ease of reading. In any case, letters must be of such sizes as to be easily read within the caution area. Standard signs can be made available in different shapes—round, square or rectangular. Here again periodic changing would result in more noticeable signs. In fact, variations from time to time in all these factors minimize monotony and thus make the safety signs more constantly noticeable.

Must Be Well Maintained

By R. C. HENDERSON
Master Carpenter, Baltimore & Ohio, Dayton, Ohio

This subject involves more than just signs reading "Safety First", "Be Safe Today" or "Safety Above Everything Else"; it includes railroad crossing signs, speed-limit signs, clearance signs and all signs that are used for no other purpose than for the safety of railroad employees and the public.



Safety signs now commonly in use can be improved in many ways so they will continue to attract attention. One way is to use paints of a more vivid color. Another is to make the shape and style of the sign suit its particular location better. In many cases, it is advisable to change to a reflectorized type similar to those on highways.

However, the most effective method to make the signs now in use continue to attract attention is good maintenance. Signs when put in use are neat and attractive, but all too often they soon become dirty through neglect or lack of funds. Thereby they lose their effectiveness to such an extent that they have an effect opposite to their intended purpose. This is true even with the enameled type of sign, although its use is justified by its attractiveness and low cost of maintenance. Most safety signs are made up of simple slogans in which the word "safety" is so important that nothing should be added that might tend to weaken its true meaning.

On our roadway signs, red means "danger", green indicates it is safe to proceed, and in most cases yellow indicates "caution". Therefore, with the meaning of these colors so firmly established, they might be used to a larger extent on our present safety signs. For instance, why not use a bright yellow on crossing signs? Would it not continue to attract the attention of drivers more than plain white? However, as previously mentioned, the most important point in keeping safety signs attractive is that they must be given sufficient maintenance at all times so that they stand out above other objects in their vicinity. When this is done they will catch the eye and continue to fulfill their mission.

It has been my experience that safety signs, when properly maintained are very effective. For instance, a few months ago our safety department put out a safety button about 1¾ in. in diameter to be worn on the coat lapel. The background on the button is royal blue with the words "Safety Is Everybody's Job" in white letters. It is surprising the attention it continues to receive from fellow employees and the public.

How Many Men Per Foreman?

How many laborers can one foreman handle efficiently in track work? Does the character of the work make any difference? Under what conditions should he have an assistant?

Depends on Man and Work

By Malcolm E. Condon
Construction Supervisor, Erie, Jersey City, N. J.

As always, the human factor enters into the answer as to how many trackmen a foreman can handle efficiently. Coupled with this human factor is the character of the location of the work. In other words work, in terminal areas, or on light-traffic branch lines, normally lends itself more readily to the use of more men in doing ordinary track-maintenance work, than does work on main-line or heavy-traffic territories.

A foreman in yard territory can handle six or seven men efficiently for ordinary maintenance work, and perhaps as many as 10 or 12 for special jobs where manual effort is a prime factor—such as removal of switch timber, surfacing leads or ladders, raising yard tracks, renewing turnouts, and other similar jobs where the work is relatively localized, with all of the men working within voice range. It is important that the foreman, with such a large gang, devote all his time to job supervision, to insure smooth progress in an efficient, safe manner. If a gang of this size is to be used as a "small extra gang" in the yard area to do programmed work, it is advantageous to employ an assistant foreman as well, permitting a more flexible use of the men, as conditions dictate each day.

With this set-up, an assistant foreman, with perhaps five men, can assemble the material in the morning, while the foreman, with the remaining men and tools, can start the preliminary work. With the arrival of the material, such as switch timber, cross ties, tie plates, rail, switch material, etc., required in the work, the job can move into high gear immediately. By the same token, at the end of the day, the assistant foreman with his five or six men can gather up the released material and remove it to material or scrap piles, or points where it can be loaded out (or burned, as in the case of old switch timber or ties). The foreman, with his group, can remain behind and clean up the job, dressing up the ballast, gathering up small scrap, and putting the finishing touches on the day's work. With proper timing, both gangs will complete their respective tasks at the close of the work period, with the net result that efficient use of the men and good planning combine to yield the greatest possible return for the maintenance dollar.

On main-line sections, a foreman can best handle a gang of not more than five men—not for lack of ability, but because normal maintenance work is usually of a minor character, such as surfacing joints, tightening bolts, etc. A larger section gang is not required for such work, and use of more men would necessitate spacing the men out to such an extent that the foreman would have considerable difficulty in directing the operation.

A gang of five men, with the foreman, can handle a section motor car easily, and be seated without crowding on the car in traveling to and from the work location. Such a gang can handle almost any emergency condition, such as renewing a broken rail, frog, or switch point, without additional help. Such a gang can be combined with another gang of equal size to do heavier, or out-of-face work on a day-to-day basis, such as the renewal of tie plates, angle bars, lag screws, spikes, etc.

In conclusion, with so many variable conditions present to temper one's decision as to the size of the gang, and the necessity for an assistant foreman, it is best to establish each gang, in terminal areas particularly, to meet the conditions on each particular section. In some instances, it may be more efficient to have an assistant foreman with a small gang of five or six men. In another case, it might be best to set up a "floating" yard gang of even 16 or 18 men, with an assistant foreman and foreman, and cut down the remaining yard gangs to a foreman and three men.

The track supervisor, on the basis of past experience, and with a clear picture of the year's maintenance program, can best determine the size of the respective gangs, and, knowing his foremen, can best judge their "capacity" for handling men efficiently and safely.

Use Assistant for Training

By Charles Miller
Assistant Roadmaster, Western Pacific, Elko, Nev.

The number of laborers that one foreman can efficiently handle depends on at least four factors: (1) The nature of the work to be performed by this foreman and his men (2) the experience and ability of the foreman involved, (3) the type of labor available; and (4) the forseeable need for assistant and/or relief foremen.

One foreman without an assistant should be able to handle almost any main-line section since the gang will hardly ever consist of more than 10 to 12 men. The nature of section maintenance work is such that the men are usually working together, and it is no great chore for one foreman to handle all of them. The few section men who do perform duties that keep them away from the main body of the gang, such as track walkers, are picked from the "old timers" who do not require constant supervision. However, there are special circumstances under which a section foreman, with his small gang, should be allowed an assistant. These would include the times when he is using special machinery or when a man is to be trained in the phase of work being performed.

An extra-gang foreman, I think, should always have an assistant assigned to his gang, primarily to provide a source of properly-trained young foremen from which to draw later. Even on a small extra gang, such a training program would be very beneficial, but a man can learn to run big gangs only through experience. When the older extra-gang foreman retires, it is often hard to replace him with a new man who can handle the job adequately. Proper training of foremen is essential and the cost is justified by the results.

Most extra gangs are engaged in projects which require more detailed supervision than one man can give. This is another reason why all such gangs, regardless of size, should be allowed an assist-

ant foreman. It is the foreman's first duty to attend to the over-all supervisory and administrative requirements of his gang. To do so properly he must often relegate some of the minor supervision to an assistant, thereby allowing himself a freer movement in handling other problems that can come up.

As the extra gang increases in size to provide manpower for special AFE programs (rail laying, ballast work or new construction) the need for assistant foremen increases in proportion. As an example, a large steel gang should have an assistant foreman in charge of each separate phase of the work. The foreman is thus free to exercise a roving supervision over the entire operation, including the necessary liaison work between the track forces and the dispatcher's office.

On ballast programs the same situation is encountered. Each phase of the job should be the responsibility of a designated assistant foreman who, in the meantime, is gaining experience from which both he and the company can benefit a few years hence.

Using Attachments on Railway Machines

What factors must be given consideration in deciding whether to provide attachments for roadway machines to convert them into multi-purpose units? What arrangements should be made to have the attachments available with the machine at all times?

Attachments Must Work Too

By R. B. CHAPMAN
Supervisor Work Equipment & Welding, Southern Pacific, San Francisco

When providing attachments for roadway machines which convert them into multi-purpose units, consideration must be given to the matter of determining to what extent their scope of activities can be increased without curtailing the established service or purpose for which they were purchased.

In operating 25 crawler-type shovels, it was found that enough machines were available to equip them with shovel front, long-boom clamshell and dragline buckets, pile leads and several with a backhoe. With this combination of accessories, all machines are in continuous service.

The situation is reversed with our crawler-type tractors. More dirt-moving work is demanded of our bulldozers and scrapers than can be done. Therefore, no consideration is given to equipping such machines with booms and winches for crane or dragline work.

We began our rail grinding with special machines for the different types of work, but soon found that it was difficult to keep some types in continuous service. This was changed to provide more machines with attachments to cover all types of grinding. This method has proved more satisfactory. Grinders are assigned to a reasonable short territory where but little difficulty is experienced in having the attachments available. With the heavy equipment, a work-service (MW) flat car to carry all attachments is assigned to each machine. This car may be held without unloading during progress of any work assignment.

Consider Purchase Carefully

By A. W. MUNT
Supervisor Work Equipment & Welding, Canadian Pacific, Toronto, Ont.

There are four general factors that must be given consideration in providing attachments for roadway machines. They are: (1) The workability of the attachments and the economies that may be derived from their use; (2) how much the attachment will be used; (3) the cost of the attachment, the time required to install it, and whether the design of the machine on which the attachment is to be used is sufficiently rugged and versatile to operate it efficiently; and (4) whether parts and service will be available for a reasonable period of time.

If attachments are purchased blindly without giving consideration to these factors, it will be found that some attachments will not do the work claimed for them. Others, when put to actual use, will prove to effect very little economy. Certain ill-chosen attachments can be found lying idle much of the time because operators have found that they either take too long to install or perhaps they unbalance the parent machine to such an extent that damage may occur. However, attachments chosen after careful consideration has been given to the above factors can not only produce large economies, but also effect greater utilization of the machine.

The arrangements that should be made to have the attachments available with the machines at all times depend a great deal on the size of the railroad and the facilities available to store the attachments. On small railroads attachments could probably be stored to best advantage at a central point and quickly shipped to the machine on short notice when required. To avoid any delay to the work the need for the attachment should usually be anticipated a day or two in advance. This would apply to almost all attachments except those used for snow handling. To be readily available for snow handling the attachments required should be carried with the machine on its carrier car at all times during winter months.

On large railroads the attachments required for current use should be carried with the machine on a carrier car at all times. On most Canadian railroads cabin-carrier cars are provided for each machine and these cars are used for carrying the attachments required for current use. Many of the attachments are used specifically for various seasonal operations during the year. When such attachments are not required until the next season, they can be stored in the maintenance-of-way shop on each district and shipped to the machine on the approach of the season for which they are required. Large units, such as shovel attachments for cranes, should also be stored in the district maintenance-of-way shop during the off season.

Largely a Transport Problem

By HARRY MAYER
Engineer Scales and Work Equipment, Chicago & North Western, Chicago

In recommending the purchase of a new machine, consideration should be given to obtaining only

(Continued on page 466)

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Learn more about the ***Pneumatractor.*** Write Schramm's Railway Sales Department for Bulletin NEU 50-B.

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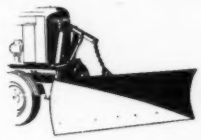

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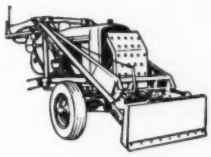

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such attachments as will provide complete utility of the machine. As to machines already in service which were purchased for specific work and which could be used for other purposes part of the time, investigation should be made of new and improved attachments, determining what attachments will produce full utility of the machine and do the work efficiently and economically.

An answer to the second part of the question involves several groups of machines such as those which require the use of idler cars for transportation; those which require loading on cars for work or for transportation; machines which are self-propelled, traveling or working on track; and self-propelled machines, mounted on crawlers or on rubber-tired wheels.

When idler cars are necessary for the transportation of such machines as locomotive cranes, pile drivers, etc., attachments such as magnets, buckets, pile driver leads and other equipment can be securely blocked on the idler cars.

Attachments for rail-handling cranes, crawler cranes, steam ditchers, etc., can be carried on the cars on which such machines must be loaded for transportation or use.

Self-propelled, track-mounted machines, such as scarifiers, discers, ballast cleaners, weed burners, etc., are usually designed to have their attachments permanently mounted on them. If, however, additional improved attachments are designed for use on this type of machine, which cannot be carried on it, arrangements will have to be made to transport the attachments by truck or trailer.

Crawler-mounted machines, such as bulldozers, are usually equipped with permanently-mounted attachments such as a bulldozer blade, or winches. This type of equipment is usually loaded on a trailer and moved from point to point by truck. If the trailer is not large enough to accommodate the tractor and all attachments, the latter must be loaded in the truck which hauls the trailer.

On the self-propelled machines such as tractors, road graders, etc., mounted on rubber-tired wheels, attachments such as booms, mower bars, front-end loaders, trench diggers, etc., are often used. Such attachments can be hauled by truck for short distances, but for long distances, it is more economical to provide a flat car on which to load the machine and the attachments.

Securing Open Deck to Steel Bridges

What is the most economical method of securing track ties to steel bridge spans to prevent the loss of the entire deck in case of high water?

Home-Made Clip Effective

By G. G. THOMAS
Engineer of Bridges, Atlantic Coast Line, Wilmington, N. C.

The fastening of open decks to steel bridges has presented a great many difficulties during my 40 years of experience. Our practice at the beginning of that period was to use ¾-in. bolts with enlarged or carriage-bolt-type heads resting on top of the ties and with clip plates held by the bolts against the underside of the girder or stringer flanges. Because the carriage-bolt-type head, even with its 2-in. diameter, worked into the top of the tie, its use was abandoned in favor of machine bolts with cast washers, 3 in. in diameter, under the bolt heads. The clip plates at the bottom of the bolts were held up against the underside of the girders or stringers by means of two nuts.

The cast washers, like the bolt heads, also cut into the top of the ties causing the clip plates underneath the stringers and girders to become loosened until they no longer had an effective bearing. The use of bolts was found to have a further objectionable feature in that the nuts underneath the clip plates became rusted to such an extent that they had to be wrung off or the bolts burned off when jacking up track to paint under ties or when replacing old decks. The bolts had a still further objectionable feature in requiring that a hole be bored through the treated ties, allowing moisture to penetrate around the bolts.

For the past 15 years we have used a tie fastening consisting of a tie clip, 2 in. wide, burned out of a ½-in. or a ⅝-in. plate. The clip has on its bottom end a 2-in. projection which extends under the outer edge of the stringer or girder. With the projection under the girder, the plate is bent sidewise at such a point that it will lap over the top of the tie. One hole is punched or drilled in the top of the plate to accommodate a track spike driven into the top of the tie. An additional track spike is driven into the side of the tie to prevent the tie clip from working backward away from the girder or stringer. These tie clips are used in pairs on every eighth tie. They are painted with one coat of red lead and one coat of black paint before being applied and are repainted whenever the remainder of the structure is repainted. This type of tie fastening is easily removed when necessary to change decks or to jack up ties for repainting the steel. Whenever removal is required the tie clips and the track spikes are recovered.

Before adopting this type of fastening, a pair of tie clips was applied to one tie located at the end of a 50-ft. deck-girder span. By means of a sling attached to this tie, the end of the girder span was lifted and supported by the tie clips 2-ft. clear of blocking. This would indicate that this type of tie clip can prevent the loss of open decks in case of high water.

Fasten With Hook Bolts

By E. S. BIRKENWALD
Engineer of Bridges, Western Lines, Southern, Cincinnati, Ohio

Using hook bolts to fasten timber decks to steel bridge spans will prevent the loss of the deck should water rise sufficiently high to produce a buoyancy effect. Hook bolts should be placed in at least every fourth tie to provide sufficient anchorage. Several years ago A.R.E.A. Committee 15, in its annual report (Vol. 50, page 447, A.R.E.A. Proceedings), recommended several types of hook bolts, any of which is satisfactory. Hook bolts have also on occasion served to protect steel deck spans when derailments have occurred.

Although the question refers only to decks of steel bridges, the subject would not be complete unless decks of timber trestles were included. Stay rods, illustrated on page 7-38 of the A.R.E.A. Manual,

(Continued on page 468)

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provide the most economical method of securing stringers to bents, and through bolts will secure the trestle ties to the stringers. Four stay rods per stringer chord at each intermediate bent, and two at each end bent, will provide sufficient anchorage. Through bolts in every fourth tie will afford the necessary anchorage of ties to stringers.

Calibrating Fuel-Oil Meters

On what schedule should diesel fuel meters be overhauled or recalibrated to insure accurate registration? Should the work be done by the railroad or the meter manufacturer?

Recalibrate Periodically

By A. B. Pierce

Engineer Water Supply, Southern System, Washington, D. C.

The hours of operation, operating pressures and the character of the diesel fuel oil used all have a definite bearing on the life of meters and the schedule for overhauling and recalibrating them.

Fundamental requirements for meter installations should be followed as to: (1) Elimination of air and vapors which might become trapped or induced ahead of the meter; (2) suitable means of segregating dirt, scale or other foreign particles, (3) pressure control which will keep the meter operating and measuring within the limits of acceptable acuracy. If a meter is to be installed for, let's say, a 300-g.p.m. pump, it is well to order a 400 g.p.m. meter. A meter should not be installed to operate constantly or intermittently at its maximum rated capacity.

The schedule of recalibration is to a great extent based on the functioning of the meter itself according to the vagaries of the installation and tactics employed by the operating personnel. A meter may be calibrated periodically after installation until the record indicates extension of this period.

Overhaul would of course become necessary after recalibration programs indicate the range of adjustment has been exhausted in the registration-correction device of the meter. The latter condition is indicative of wear to the extent that leakage or slippage through the meter cannot be compensated for, and accordingly requires the replacement of worn parts with the necessary new parts.

In brief, then, the frequency of calibrating a meter is dependent upon the installation and operating characteristics and should be governed by records of the meter's performance starting generally once every 30 days and extending as indicated. Repair work should be conducted by experienced personnel, preferably by those personally instructed by the meter manufacturer, using their approved methods and special tools to effect such repairs.

Allow Three Per Cent Error

By L. C. Atchison

Chief Chemist, Denver & Rio Grande Western, Denver, Colo.

We recalibrate meters whenever the routine procedures—daily, or other gaging—show that the meter is off more than plus or minus three per cent. In calibrating our meters we use a measured water tank and can usually get the meter in proper condition. However, where the gears are badly worn, etc., we ship the meter to the manufacturer for overhaul. The usual troubles are dirt and lack of lubrication. We have not placed too much faith in meters at any time and actually depend on gaging the tanks for the complete record.

Use Approved Test Measure

By Joseph J. Delfausse

Chief Engineer, Neptune Meter Company, New York

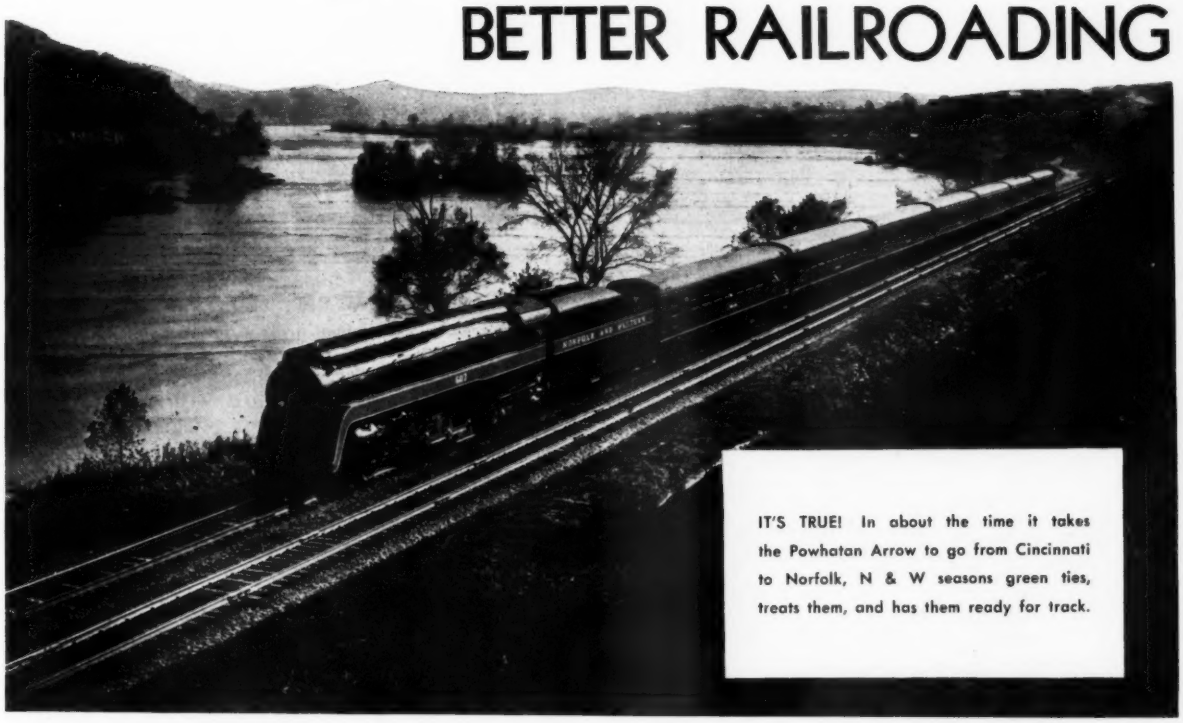
Meters which are used for measuring diesel fuel for locomotives are usually installed in the proper manner with a suitable fine-mesh screen at the meter inlet and with provision to make sure that air does not enter the meter. Under correct installation conditions, a diesel fuel meter should give very satisfactory performance and should not require a large degree of maintenance. Since meters of this type are apt to be distributed at many locations, it is suggested that the railroad take care of necessary calibration and overhauling. To do this, a suitable test measure should be provided at each meter site. This test measure must be the standard, approved type with sloping top and bottom heads and with a neck at the top calibrated in cubic inches.

We feel that a 50-gal. test measure is suitable for meters up to 2 in. in size and a 200-gal. test measure should be satisfactory for 2 ½-in. and 3-in. meters. Provisions must be made for running the fuel oil from the meters to be tested into this test measure and for draining the test measure and pumping the liquid back into storage. This procedure of pumping liquid back into storage must not be done through the same line which is used for delivering it from storage to the meter because that procedure will introduce air into this line and thereby cause improper test results. Most accurate calibration can be obtained by testing the meter at approximately the same rate of flow used for delivering fuel to locomotives.

We believe that the frequency of overhauling diesel-fuel meters should depend upon the results obtained when calibrating these meters. It is our suggestion that the meters be calibrated once every two months for normal operation, or once every month if unusually large quantities of oil are being handled. This might seem like much work but we do not think it will be difficult if the testing provisions are so arranged that the filling and emptying of the test measure is simplified by the proper piping and pumping facilities. If possible, this should be a permanent part of the installation.

If accurate records are kept of the meter performance at each test, a maintenance man can readily determine when it is time to open up the meter and check the measuring-chamber parts for wear. A small amount of wear, which will occur after a few million gallons of liquid has passed through the meter, will necessitate a change in the calibration of the meter. This is accomplished, in the case of Red Seal meters, by means of the gear shifter built into most of the registers. When the records show that the meter wear has necessitated a change of gears more than ¾ of 1 per cent away from the initial setting, it is then time to look into the meter and replace the worn parts.

Norfolk and Western uses BETTER CROSSTIES for BETTER RAILROADING



Norfolk and Western engineering officials expect Vapor-Dried crossties will last at least two years longer in track than air-seasoned crossties, and will also cost less in the long run.

They reached these conclusions after careful investigation, observation, and processing of more than 100,000 ties by this new and better method of seasoning before creosoting. In addition to longer life, the Norfolk & Western points to other economic advantages of Vapor-Drying*, including:

1. Deeper penetration and better distribution of preservative.
2. Greatly reduced green tie inventory.
3. Substantial savings in interest and insurance.
4. Considerable savings in less handling.

If you did not see Railway Age's report, "Norfolk and Western Expects Longer Life from Crossties", write for your copy now. Let us show you, too, how Vapor-Drying can prolong the life of your ties and reduce costs.

T-C TAYLOR-COLQUITT CO. TIMBER CONSERVATION ®

*Process Patented.

TAYLOR-COLQUITT CO.
SPARTANBURG, SOUTH CAROLINA

PRODUCTS OF MANUFACTURERS

New, improved equipment, materials, devices

(For additional information on any of the products described in these columns, use postcards, page 415.)

NEW CHAIN SAW BY HOMELITE

THE Homelite Corporation, Port Chester, N. Y., has scheduled for early production a new 27-lb., 4-hp., gasoline-powered chain saw,

known as the Model 26LCS. Special features of the saw include a narrow-kerf Homelite chain which minimizes waste cutting, thereby reducing power requirements, and a Gilmer belt drive which eliminates the need of gears.

The saw, because of its good balance and simple pivot action, is reported to be easy to handle in making any kind of cut. Operation is controlled by a single throttle button on the handle. An automatic centrifugal clutch stops the chain when the engine idles and prevents engine overload if binding of the chain occurs. A concentric-bowl carburetor permits operation at any angle. Changing from a vertical to a horizontal cutting position is done simply by pushing a button and rotating the saw.

The new Homelite chain saw is equipped with ball and needle bearings at all points of friction. A built-in governor keeps the engine from racing after the chain completes a cut A simple plunger lubricator oils the chain, sprockets and guide bar. The saw will be available with one-man straight blades in sizes of 18 in., 23 in., and 30 in.; and with two-man straight blades in sizes of 23 in., 30 in. and 42 in. Bow saws, for one or two-man operation, will be available in sizes of 19 in. and 25 in.

POCKET-SIZE HARDNESS TESTER

THE A. H. Company, Brighton, Mich., has developed a self-contained instrument for testing the

hardness of materials, which is so small and light that can be carried in a pocket. It would, therefore, be conveniently applicable to such field-testing work as checking the hardness of heat-treated rail ends. The hardness readings obtained with the device, which are reported to be consistently accurate, are derived from the surface elasticity of the material under test.

In operation the tester drops a simple non-elastic carboloy-tipped hammer a pre-determined distance and then records the height that the hammer rebounds. From charts accompanying the tester the rebound readings can be quickly and accurately converted to either Rockwell or Brinnell hardness numbers.

STEEL TAPE WITH VINYLITE-COVERED CASE

THE Lufkin Rule Company, Saginaw, Mich., is now offering a chrome-clad steel tape, known as the Leader, with a maroon-colored Vinylite-covered case which is reported to resist water, stain and scuffing. The case has a roller-type throat, an inset flat stainless-steel edge band, and an attractive name plate. The winding mechanism is nickel-plated and has a folding flush handle opened by a push pin. The tape comes in lengths of 25 ft., 50 ft., 75 ft., and 100 ft.

(Please turn to page 472)

FENCE TO FENCE SPRAYING

Is Revolutionizing Control of

Weeds and Brush

Numerous railroads did small scale test work in the growing season of 1950, combining in some instances chemical work in weed control with similar treatment in brush control work.

Almost without exception all of such roads have shown a disposition to expand the work for the growing season of 1951.

Figures accumulated last year proved beyond a doubt that such work offers great opportunities for tremendous dollar savings as compared to the present high cost of mowing.

Railroads that frown on such high costs should this year do nothing less than small scale work to become familiar with this improved method.

We volunteer to co-operate on either small scale test work or on more sizable treatments.

An exchange of information is invited.

READE MANUFACTURING COMPANY, INC.

C H E M I C A L W E E D K I L L E R S

JERSEY CITY 2, N. J.

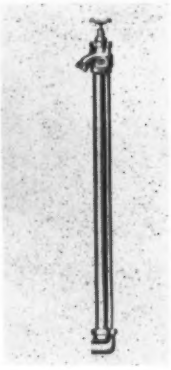
WESTERN OFFICE: CHICAGO 28, ILL.

WORKS: JERSEY CITY • CHICAGO • KANSAS CITY • MINNEAPOLIS • BIRMINGHAM

For additional information on any of the products described on this page, use postcards, page 415.

ALL-WEATHER HYDRANT

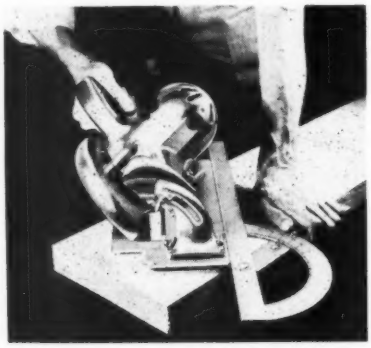
THE J. A. Zurn Manufacturing Company, Erie, Pa., is now offering a sanitary hydrant which is reported to function properly at temperatures ranging from 100 deg. above to 70 deg. below zero, and at static water pressures from 25 p.s.i. to 130 p.s.i. The casing of the hydrant encloses a special rubber sleeve. When the water pressure is turned on, the water flows between the inside of the casing and the outside of the rubber sleeve, and remains in that space after the pressure is shut off. If the remaining water freezes during cold weather, the elastic action of the rubber sleeve, when the water pressure is turned on, breaks up the ice and the flow of water flushes it out.



The open area of the hydrant is at all points at least equal to the open area of the pipe connections. Thus the maximum rate of flow is provided with a minimum drop in pressure. The standard hydrant is available in sizes of ¾ in. and 1 in. and in casing lengths ranging from 2 ft. to 9 ft. The entire internal assembly of the hydrant, including the rubber sleeve and the valve seat, can be removed as a unit, when necessary, without disturbing the buried casing.

SAW PROTRACTOR

THE Black & Decker Manufacturing Co., Towson, Md., has announced a protractor for use as a guide when sawing with portable electric saws, which is said to permit cutting at practically any horizontal angle easily and accurately. The device, constructed of metal and weighing 1½ lb., consists of a straight edge, a segment clearly calibrated in units of one degree, and a movable holding arm. The desired angle is set by loosening a wing nut on the under side of the holding arm and moving the arm until an indicator points to the correct degree mark. The wing



nut is then retightened to prevent slippage of the holding arm.

After the desired angle has been set, the side of the shoe of the power saw is placed against the protractor's straight edge and the saw is advanced along this edge. When the protractor is used in conjunction with a power saw having a bevel adjustment, compound miter cuts can be sawed easily and accurately. The device can also be used for laying out carpentry work involving angles.

IMPROVED SERIES OF SAFETY GOGGLES

TWO completely revised and improved series of safety goggles—the 7000 and the 3081—have been announced by the American Optical Company, Southbridge, Mass. The goggles in the 7000 series are each of metal construction with a rigid saddle bridge and reinforcing bar for extra strength. The temples are made of brown tubing which cannot discolor. The temple and endpiece screws are of Evertite construction with countersunk, non-sagging heads. The eyewires are flat and are engraved with attractive beading. The eyewire bar is also engraved. The lenses in this series of goggles can be replaced without removing the side shields.

The goggles in the 3081 series have the same design features as those in the 7000 series. However, the bridge and reinforcing bar of

The top picture shows one of the AO 7000 series goggles. Below it is one of the 3081 series

the 3081 series goggles are covered with a soft leather guard to protect the wearer against heat or cold, foreign bodies and stray light. The side shields are also of soft leather and are permanently attached to the eye wire. The lenses can be replaced without removing the side shields.

The goggles in both series can be obtained with clear or Colobar, regular or six-curve Super Armorplate lenses.

What Our Readers Think

RE OUR MARCH ISSUE

Peoria, Ill.

TO THE EDITOR:

YOUR March, 1951, Equipment Economies Number had something different. True—it had its usual good editorials, feature articles, advertisements, and an unusually fine front cover, but, after a first quick glance through the issue, one realized something else was impressive.

It was after starting through the issue a second time that I discovered the new and pleasing feature. The little dash of blue here and red there throughout the feature section surely added something to the magazine and held one's attention.

Congratulations for a job very well and cleverly done!

F. E. SCHAUMBURG
Railroad Representative
Sales Development Division
Caterpillar Tractor Company

THE MONTH'S NEWS

Railway Personnel

General

Roswell E. Flack, track supervisor on the Southern at Lawrenceburg, Ky., has been appointed trainmaster at Huntingburg, Ind.

Alvin D. Dugan, assistant vice-president, operations and maintenance, of the New York Central, recently retired after nearly 50 years of service.

F. G. Cobb, division engineer of the Richmond division of the Chesapeake & Ohio, has been appointed trainmaster of the Peninsula sub-division, with headquarters as before at Richmond, Va.

Roy Putnam Hart, chief engineer of the Missouri Pacific Lines, has been appointed chief operating officer, with headquarters at St. Louis, Mo., as announced in the April issue. Born at Springfield, Mo., February 14, 1892, Mr. Hart was graduated from the University of Missouri in June, 1913, with a Bachelor of Science degree in civil engineering. He started with the M. P. the day after graduation as a timekeeper on a bridge-building gang. Subsequently he served as foreman of a bridge-building gang, as bridge engineer and as assistant engineer until late in 1943, when he was advanced to assistant chief engineer. Less than two years later he was further advanced to chief engineer in charge of construction and design. In the early autumn of 1949 his jurisdiction was extended to include responsibility for maintenance of track, right of way and bridges over the system.

Roy Putnam Hart

Kenneth L. Moriarty, chief engineer of the Denver & Rio Grande Western, with headquarters at Denver, Colo., has been appointed assistant general manager. Mr. Moriarty was born on November 18, 1896, and began his railroad career in the engineering department of the Great Western. He entered Rio Grande service as division engineer at

(Continued on page 474)

Railway Personnel (Cont'd)

Gunnison, Colo., in July, 1924. Later he served in that position and as road-master and trainmaster at various points until 1939, when he was promoted to superintendent at Grand Junction, Colo.,

Kenneth L. Moriarty

being transferred in the same capacity to Salt Lake City, Utah, in 1943. Mr. Moriarty became assistant chief engineer in February, 1946, and has been serving as chief engineer since January, 1948.

Engineering

John Ayer, Jr., assistant chief engineer of the Denver & Rio Grande Western, has been promoted to chief engineer, with headquarters continuing at Denver, Colo. He succeeds **K. L. Moriarty,** who has been appointed assistant general

John Ayer, Jr.

manager, as announced elsewhere in this issue. Appointed to succeed Mr. Ayer is **H. C. Cosand,** who retains his duties as engineer of capital expenditures in addition to his new assignment. Mr. Ayer was born on October 6, 1912, and upon graduation from the Massachusetts Institute of Technology in electrical engineering, he entered railroad service with the Pennsylvania in August, 1936, as a signal apprentice at Chicago. He was furloughed in June, 1938, on account

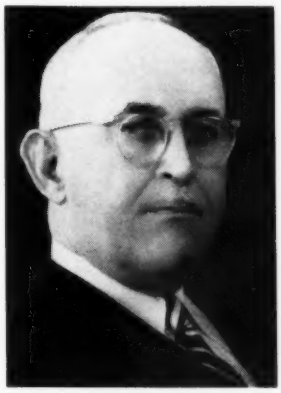
of force reduction and the following October joined the Rio Grande as signal inspector at Denver. Later he served as signal supervisor, assistant signal engineer and assistant engineer of capital expenditures, becoming assistant chief engineer in October, 1949.

Robert H. Campbell, track supervisor on the Southern at Bremen, Ga., has been promoted to assistant division engineer at Birmingham, Ala.

Herbert L. Miller has returned to his position as division engineer of the Eastern division of the Atchison, Topeka & Santa Fe, with headquarters at Emporia, Kan.

Murray O. Cochrane, assistant engineer maintenance of way, subsidiary lines, of the Southern, at Hickory, N. C., has been promoted to engineer maintenance of way, subsidiary lines, with headquarters at Charlotte, N. C.

William H. Giles, who has been promoted to assistant chief engineer system—construction of the Missouri Pacific Lines, with headquarters at St. Louis,



William H. Giles

Mo., as announced in the April issue, was born at Little Rock, Ark., December 4, 1891, and was educated at Washington University, St. Louis extension division. Entering M. P. service in August, 1914, as a ballast inspector, he subsequently served as rodman, instrumentman and assistant engineer until his appointment as engineer of design in February, 1937, which position he held until his promotion.

R. W. Middleton, assistant engineer on the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Chicago, has been promoted to division engineer, with headquarters at Terre Haute, Ind., succeeding **R. J. Coffee,** who has entered military service.

W. F. Turner, division engineer of the Southern Pacific's Sacramento division, has been appointed construction division engineer, with headquarters remaining at Sacramento, Cal., to supervise the construction of a retarder yard at Roseville, Cal. He is succeeded by **W. J. Jones,** assistant division engineer at Ogden, Utah.

(Please turn to page 476)

Railway Personnel (Cont'd)

William E. Manning, who has been appointed chief engineer of the Atlantic & Danville, with headquarters at Lawrenceville, Va., as announced in the

William E. Manning

March issue, was born at Sutherlin, Va., on October 14, 1911. Following graduation from the Virginia Polytechnic Institute with a Bachelor of Science degree in engineering, he entered the service of the Southern as a rodman in the chief engineer's office at Charlotte, N. C., in November, 1937. He became a student apprentice, with headquarters at Richmond, Va., in September, 1938, later serving in a similar capacity at Danville, Va., Durham, N. C., and Salisbury, N. C. On July 1, 1940, Mr. Manning was appointed track supervisor at Camden, S. C., and subsequently held the same positions at Orangeburg, S. C., Blackville, S. C., and Salisbury. He was serving at the latter location at the time of his recent promotion.

William E. Mercer, whose promotion to division engineer of the Terminals division of the Canadian Pacific at Fort William, Ont., was announced in the

William E. Mercer

March issue, was born at Strasbourg, Sask., on July 25, 1915, and graduated from the University of Saskatchewan in 1940 with a degree of Bachelor of

Science in civil engineering. He entered the service of the C. P. R. in 1941 as a transitman at Winnipeg, Man. Following service overseas in the railway operating group of the Royal Canadian Engineers from 1942 to 1945, Mr. Mercer returned to his former position on the railroad. In 1949 he was appointed engineer on the new boiler plant at Winnipeg, retaining that position until two months before his recent promotion. during which he served as relieving roadmaster for the terminals at Winnipeg.

W. Lenco, assistant bridge engineer on the Canadian National, has been promoted to bridge engineer, with headquarters as before at Moncton, N. B., succeeding **J. C. King,** who has been transferred to Toronto, Ont., to replace **T. H. Jenkins,** who has been promoted.

L. P. Jones has been appointed division engineer of the Union (part of the Missouri Pacific Lines) at Memphis, Tenn., succeeding **K. G. Williams,** who has retired after 33 years of service.

T. Fred Burris, who has been promoted to assistant chief engineer of the Chesapeake & Ohio's Pere Marquette district, with headquarters at Detroit,

T. Fred Burris

as announced in the April issue, was born at Sault Ste. Marie, Mich., July 27, 1899, and graduaated from Michigan State College in 1924. Mr. Burris entered railroad service in October, 1928 with the Pere Marquette (now P.M. district, C.&O.), and after holding various positions in 1925 he joined the U. S. Army, Corps of Engineers. When he returned to the P.M. in 1928, he was appointed instrumentman at Saginaw, Mich., and in 1929 became assistant engineer at Grand Rapids. Mr. Burris was advanced to division engineer in 1943, and continued in that position until his promotion.

C. R. Montgomery, division engineer on the Pennsylvania, with headquarters at Harrisburg, Pa., has been promoted to engineer maintenance of way, with the same headquarters, succeeding **F. P. Filippelli,** who has been granted a leave of absence because of illness. **G. M. Smith,** engineer maintenance of way and structures of the Washington Terminal,

(Continued on page 478)

Railway Personnel (Cont'd)

at Washington, D. C., has been appointed division engineer at Harrisburg to succeed Mr. Montgomery, and is in turn succeeded by **C. F. Parvin,** assistant division engineer at Williamsport, Pa. **H. J. McNally,** supervisor of track at New Brunswick, N. J., has been promoted to assistant division engineer at Williamsport to succeed Mr. Parvin. **P. S. Settle,** assistant division engineer, has been appointed acting division engineer, with headquarters as before at New York, succeeding **K. J. Silvey,** who has been assigned to special work. **S. M. Rogers** has been appointed acting assistant division engineer at New York to replace Mr. Settle.

A. C. Danks, Jr., whose promotion to bridge engineer of the Union at East Pittsburgh, Pa., was announced in the March issue, was born on August 6,

A. C. Danks, Jr.

1908, at Wilkinsburg, Pa., and attended Carnegie Institute of Technology at night, graduating with the degree of Bachelor of Science in civil engineering in 1940. He entered railroad service on May 11, 1937, as assistant engineer in the valuation department of the Union, and on January 1, 1941, became draftsman in the maintenance-of-way department. Mr. Danks was promoted to structural engineer on March 16, 1944, chief draftsman on January 1, 1947, and resident engineer on May 16, 1950, retaining the latter position until his recent appointment.

William J. Kernan, whose promotion to division engineer of the Mohawk division of the New York Central, at Albany, N. Y., was noted in the February issue, was born in Albany in 1896 and received his higher education at Rensselaer Polytechnic Institute. He entered the service of the N.Y.C. as a chainman in the maintenance-of-way department at Albany in 1917. During World War I he served in the U. S. Navy, returning to the Central in 1921 as inspector of bridges and buildings at Albany. Mr. Kernan was appointed assistant division engineer at Rochester, N. Y., in 1929 and was transferred in that capacity to

Weehawken, N. J., in 1937. He became supervisor of track at Jersey Shore, Pa., in 1940, and since 1943 has been assistant district engineer at Boston, Mass.

I. D. Talmadge, whose appointment as engineer maintenance of way of the Lehigh & Hudson River at Warwick, N. Y., was announced in the March issue, was born at Mountain Lake, N. Y., on June 7, 1894. He began railroad service in the engineering corps of the New York, Ontario & Western at Middletown, N. Y., on September 1, 1911, subsequently holding various positions in the corps. Following military service, he was appointed pilot engineer at Middletown, N. Y., in December, 1918, and in June, 1919, was advanced to assistant roadmaster at Walton, N. Y. From June, 1920, to November, 1944, Mr. Talmadge served successively as roadmaster, valuation engineer and district engineer at Middletown. On November 1 of the latter year, he went with the Lehigh & Hudson River as roadmaster at Warwick, which position he held at the time of his recent promotion.

Track

M. T. Abrahamson, roadmaster on the Canadian National at Vancouver, B. C., has retired after 35 years of service, and **J. A. Deschenes,** roadmaster at Rivere du Loup, has retired after 44 years of service.

Lawrence E. Rundell has returned to his position as roadmaster of the Enid, Stillwater and Cushing districts of the Atchison, Topeka & Santa Fe, succeeding **Francis T. Rees,** who has been appointed assistant roadmaster on the Oklahoma division.

F. O. Johnson, junior engineer on the Ft. Wayne division of the Pennsylvania, has been promoted to assistant supervisor of track on the Susquehanna division, succeeding **K. E. Smith,** who has been transferred to the Panhandle division. Mr. Smith succeeds **W. E. McCoppin,** who has resigned. **C. G. Miller,** junior engineer on the Chicago division, has been promoted to assistant supervisor of track on the same division, succeeding **W. B. Newell,** who has been transferred to the Philadelphia Terminal division. Mr. Newell succeeds **A. T. Cooper,** who has been promoted to supervisor of track, with headquarters at Dunkirk, N. Y., succeeding **W. E. McColgin,** who has been transferred to Warsaw, Ind., where he replaces **E. M. Hodges,** who has been transferred to New Brunswick, N. J. Mr. Hodges replaces **H. J. McNally,** whose promotion to assistant division engineer at Williamsport, Pa., is announced elsewhere in this issue.

Doyle A. Chambers has been appointed track supervisor on the Southern at Greenwood, S. C., succeeding **Norman M. Cary,** who has become bridge

(Continued on page 480)

Railway Personnel (Cont'd)

and building supervisor, as announced elsewhere in these columns. **Robert K. Seals,** track supervisor, at Charleston, S. C., has been transferred to Salisbury, N. C., and **William G. Park,** track supervisor at New Orleans, La., has been transferred to Lawrenceburg, Ky. **Charles B. Foster,** roadmaster on the Danville & Western, at Danville, Va., has been appointed track supervisor on the Southern at Charleston, S. C. **Thomas P. Ansley,** who has been serving as extra gang foreman at various locations on the Charlotte and Washington divisions, has been advanced to assistant track supervisor with headquarters at Gainesville, Ga.; **Wade E. Holland,** section foreman, has been promoted to assistant track supervisor with headquarters as before at Greenville, S. C.; **Thomas J. Workman,** section foreman, has been promoted to assistant track supervisor at Attalla, Ala., to replace **John T. Marlowe,** who has been advanced to track supervisor at Princeton, Ind.; **Carl S. White, Jr.,** section foreman, has been promoted to assistant track supervisor, with headquarters as before at Danville, Va.; **Charles H. Kepley,** foreman on the Danville division, has been advanced to assistant track supervisor at Greensboro, N. C., and **Albert L. Ingram,** section foreman on the Danville division, has been appointed assistant track supervisor.

Bridge and Building

Norman M. Cary, track supervisor on the Southern at Greenwood, S. C. has been appointed bridge and building supervisor at Greensboro, N. C., and **Charles S. McElreath,** assistant bridge and building supervisor at John Sevier, Tenn., has been promoted to bridge and building supervisor at Atlanta, Ga. **John Barker,** bridge and building foreman at Bristol, Va., has been advanced to assistant bridge and building supervisor to succeed Mr. McElreath.

D. P. Kinzel, supervisor of bridges and buildings on the Mohawk division of the New York Central at Albany, N. Y., has been appointed general supervisor of bridges and buildings, Buffalo and east, with headquarters at New York, succeeding **E. E. Tanner,** who has retired. **F. A. Millious,** assistant supervisor of bridges and buildings at Utica, N. Y., has been advanced to supervisor of bridges and buildings at Albany to replace Mr. Kinzel, and **H. L. Heck,** bridge and building inspector at Utica, has been appointed assistant supervisor of bridges and buildings to succeed Mr. Millious. **A. C. Mulligan,** transitman on the engineering corps, has been promoted to bridge and building inspector to replace Mr. Heck.

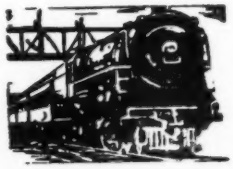
F. D. Day, assistant master carpenter on the Pennsylvania, with headquarters at Pittsburgh, Pa., has been promoted to master carpenter, with headquarters at Chicago, succeeding **J. F. Twomey,** who has resigned. **J. D. Woodward,** junior engineer on the Ft. Wayne division, has been promoted to assistant master carpenter at Pittsburgh to succeed Mr. Day. **J. D. Moore,** assistant master carpenter at Indianapolis, Ind., has been promoted to master carpenter at Harrington, Del., succeeding **Wade Mitchell,** who has resigned. **W. H. Paul, Jr.,** junior engineer on the Pittsburgh division has been promoted to assistant master carpenter at Indianapolis to succeed Mr. Moore.

Obituary

Aldridge R. Nichols, water engineer on the Wabash, with headquarters at Decatur, Ill., died recently.

M. J. J. Harrison, supervisor of scales and weighing of the Pennsylvania at Altoona, Pa., died on March 29.

Albert A. Miller, former chief engineer, maintenance of way, of the Missouri Pacific Lines, who retired in October, 1949, died on March 25.



Association News

American Railway Engineering Association

At the time of going to press seven committees had scheduled meetings to be held in May, as follows: Iron and Steel Structures, May 2-3, Benjamin Franklin hotel, Philadelphia, Pa.; Track, May 8-9, Terrace Plaza hotel, Cincinnati, Ohio; Water Service and Sanitation, May 15, association headquarters, Chicago; Roadway and Ballast, May 17-18, Netherland Plaza hotel, Cincinnati; Buildings, May 23--24, Southern office building, Washington, D. C.; Records and Accounts, May 23-24, Copley Plaza hotel, Boston, Mass.; Wood Bridges and Trestles, May 28-29-30, Portland, Ore.

Chairmen of standing and special committees met with President Blair and members of the Board of Direction on April 20. Following that meeting the Board of Direction held a special meeting.

(Please turn to page 482)

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting September 17-19, 1951, Stevens Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn Street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 11-13, 1952, Chicago. Neal D. Howard, Secretary, 59 E. Van Buren Street, Chicago 5.

American Wood-Preservers' Association—H. L. Dawson, Secretary-treasurer, 839 Seventeenth Street, N. W., Washington 6, D. C.

Bridge and Building Supply Men's Association—L. R. Gurley, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—E. C. Patterson, Secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—Secretary, 30 Church street, New York.

National Railway Appliance Association—Robert A. Carr, Secretary, 310 South Michigan avenue, Chicago 4; Lewis Thomas, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Railway Tie Association—Annual meeting September 25-27, 1951, Netherland Plaza Hotel, Cincinnati, Ohio. Roy M. Edmonds, Secretary-treasurer, 912 Shell Building, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual Meeting September 17-19, 1951, Stevens Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago 5.

Association News (Cont'd)

Maintenance of Way Club of Chicago

The annual meeting of the club was held on the evening of April 23 at Eitel's restaurant in the Field building, Chicago, beginning with dinner at 6:30 p.m. and with 171 members and guests in attendance. The speaker was W. J. Whalen, general manager, Chicago, Milwaukee, St. Paul & Pacific, whose subject was, "M/W Problems Today as Seen by Management."

In the election of officers for the ensuing year, F. A. Hess, assistant to vice-president, New York Central, and second vice-president of the club, was elected president; L. R. Lamport, engineer of maintenance, Chicago & North Western and a director of the club, was elected first vice-president; F. E. Austerman, assistant chief engineer, Chicago Union Station Company, and also a director, was elected second vice-president; Merwin H. Dick, editor, ***Railway Engineering and Maintenance***, was re-elected executive secretary; and E. C. Patterson, assistant chief clerk, Chicago & North Western, was re-elected secretary-treasurer. In addition, the following were elected directors: Roy Lumpkin, manager tie and timber department, Chicago, Rock Island & Pacific; R. E. Harmon, track engineer, Chicago Transit Authority; and A. L. Fridley, field representative, Hubbard & Co.

Metropolitan Maintenance of Way Club

The last meeting of the season was held on Thursday, April 26, at the Hotel Shelburne, New York. The program consisted of an open forum discussion on the problems that will have to be met in carrying out maintenance programs in 1951. Changes that have occurred as a result of the 40-hour week, the manpower situation, and the qualifications of a good supervisor—these were among the subjects discussed. Moderator of the discussion was C. K. Scott, engineer maintenance of way, Erie, Jersey City, New Jersey.

Supply Trade News

General

Because of increased business and the need for extended customer service, the **Dearborn Chemical Company,** Chicago, has moved into new and larger offices in the Chicago Merchandise Mart. The new company address is: Merchandise Mart Plaza, Chicago 54.

The establishment of a wood-preservation laboratory within the biochemical research department of the **Dow Chemical Company,** Midland, Mich., has been announced by Dr. D. D. Irish, director of the department. **Fred J. Meyer,** who has been working on preservatives at Dow Chemical for the past several years, will be in charge of the laboratory, assisted by **Ralph M. Gooch.**

The **Air Reduction Company** will construct a new plant at Calvert City, Ky., costing upwards of $10,000,000. Construction will begin next July 1 and operations are expected to start by January 1, 1953. The new plant will be operated by the **National Carbide Company,** one of Air Reduction's 10 operating divisions, under direction of **Russell T. Lund,** operations manager of Carbide's Louisville, Ky., Keokuk, Iowa, and Ivanhoe, Va., plants. It will occupy part of a 1,000-acre tract fronting the Tennesee river, with the remaining acreage held in reserve for expansion.

Personal

The **Southern Wood Preserving Company** has appointed **L. P. Wilburn** and **J. Harry Dunstan** as vice-presidents.

Grant A. Colton, vice-president and general manager of the **Golden-Anderson Valve Specialty Company,** Pittsburgh, Pa., has been elected president.

V. H. Peterson, manager of the Railroad division of **Fairbanks, Morse & Co.,** Chicago, has been elected vice-president in charge of railroad sales. Mr. Peterson has been with Fairbanks, Morse since

V. H. Peterson

1946. Before then he was associated with the Baldwin Locomotive Works as assistant to the president and manager of Baldwin's New York office.

Harry G. Andersen, district sales engineer of the **Link-Belt Company** at Milwaukee, Wis., has been transferred to Birmingham, Ala., as district manager, succeeding **J. T. Bell, Jr.,** who has been called back into the service of the U. S. Army, Corps of Engineers. Educated at Northwestern University, Illinois Institute

Harry G. Andersen

of Technology and the University of Wisconsin, Mr. Andersen started with Link-Belt in 1937 at the company's Pershing Road plant, Chicago, where he served in various capacities in the engineering department and Chicago district sales. He was transferred to Milwaukee in 1948.

Bradley A. Burnside has been appointed assistant to general sales manager of the **American Lumber & Treating Co.,** with headquarters at Chicago. In his new job he will be concerned principally with technical sales-research and the development of new uses for pressure-treated lumber and plywood.

Walter P. Arnold, executive assistant to vice-president and general manager of the **Wood Preserving division** of **Koppers Company, Inc.,** Pittsburgh, Pa., and **Frank H. Fischer,** assistant general manager of the division, have been appointed vice-presidents.

The **Kershaw Manufacturing Company,** Montgomery, Ala., has announced the following promotions and appointments: **J. W. Davis,** formerly chief engineer, elected vice-president; **D. W. Hallberg,** appointed direct sales representative for the eastern United States, with headquarters at Orange, N. J.; **H. H. Williams,** formerly field service engineer, promoted to chief engineer, and **W. J. Dunaway,** elected vice-president of the **Royce Kershaw Company,** railroad contractors, at Montgomery.

The **Pettibone Mulliken Corporation,** Chicago, has announced the appointments of **W. A. Blackford** as Western District sales manager, Railroad division, and **E. H. Sockwell** as Eastern District sales manager, Railroad division. Mr. Blackford has been associated with the company on the west coast since 1947. Mr. Sockwell has also been with the company since 1947 and formerly served as Eastern District representative. Pictures of both men appear on next page.

W. A. Blackford

E. H. Sockwell

William R. Wilkinson, whose appointment as vice-president for sales of the **Johns-Manville Corporation,** New York, was announced in the April issue, first because associated with the company in 1925 as a sales representative in the New Orleans (La.) district. After holding several sales positions in the south, he served successively as assistant district manager at Milwaukee, Wis., and manager of the Building Products district office at Philadelphia, Pa. Prior to his appointment as vice-president he was general merchandise manager of the Building Products division.

William R. Wilkinson

R. B. Little, who has been appointed general sales manager of the **Eaton Man-**

(Continued on next page)

ufacturing Company, Reliance Division, Massillon, Ohio, as announced in the April issue, attended Washington-Jefferson College and, in 1932, the sales school of the Republic Steel Company in Massillon. Subsequently, he joined the sales department in the New York office of that company, serving there for five

R. B. Little

years. In 1939 he was appointed sales manager in charge of the New York district of the Moltrup Steel Products Company, serving in that capacity until he joined Eaton as a sales representative in the Reliance division's New York office.

Herbert E. McCandless, vice-president in charge of circulation for the **Simmons-Boardman Publishing Corporation,** has retired.

Obituary

A. P. Ross, vice-president of the Michigan Power Shovel Company, Benton Harbor, Mich., died on March 30.

Paul Traeger, formerly manager of the service department of the Simmons-Boardman Publishing Corporation, died on March 26, after an extended illness.

Trade Publications

(To obtain copies of any of the publications mentioned in these columns, use postcards, page 415.)

Heavy-Duty Cranes—The Wayne Crane division of the American Steel Dredge Company, Inc., has published a 14-page catalog describing its heavy-duty line of ½-yd. crane-excavators. Complete specifications and operating data are included.

Right-of-Way Weed Control – The General Chemical division of the Allied Chemical & Dye Corp. has published an eight-page booklet describing the characteristics and applications of General Chemical weed killers as formulated for cumulative control of railway weeds. The booklet also gives data regarding General Chemical's weed-control spray service and presents charts showing the methods of treating various track areas.

Corrosion-Control Coatings – The use of vinyl plastic coatings for the control of corrosion on exteriors of steel, concrete, brick, formed-block and plywood structures, and as a tank lining, is discussed in an illustrated bulletin published by the Casey and Case Coating Company. Given in the bulletin are the specific properties of the material, a chemical resistance chart, and data in regard to methods of application.

Corrugated Metal Pipe—A new 16-page booklet entitled "Armco Corrugated Metal Pipe—A type for Every Need" has been published by Armco Drainage & Metal Products, Inc. It lists the types of full-round pipe and pipe-arch available to meet the specific requirements for various types of sewers, culverts and conduits. Also included are data for use in selecting the most suitable structure, details of fittings, and installation instructions.

Hydraulic Controls for Tractors—The Caterpillar Tractor Company has published an eight-page booklet which explains in detail how the three models of Caterpillar hydraulic controls fit the various models of Caterpillar track-type tractors. Job application pictures indicate the many and varied types of work to which the controls are suited, and pictorial cutaways show in detail their construction and operating features.

Advertisers IN THIS ISSUE

A

Air Reduction Sales Company----410
Allis-Chalmers Tractor Division----411
Armco Drainage & Metal Products, Inc.--430

B

Beall Tool Division of Hubbard & Co.--425
Bethlehem Steel Company----399
Bogle Company, The R. H.----420
Buda Company, The----479

C

Cabot, Inc., Samuel----426
Chapman Chemical Company----417
Chipman Chemical Company, Inc.----485
Cullen-Friestedt Co.----484

D

Dow Chemical Company, The----413
Duff-Norton Manufacturing Co., The--473

E

Eaton Manufacturing Company----398
Electric Tamper & Equipment Co.--422-423

F

Fairbanks, Morse & Co.----429
Fairmont Railway Motors, Inc.----436

G

General Electric Company----438

H

Homelite Corporation----421
Horn Company, Inc., A. C.----414
Hubbard & Co.----425

I

Industrial Brownhoist Corporation----412
Ingersoll-Rand Company----405
International Harvester Company----404

K

Koehring Company----408

L

Layne & Bowler, Inc.----486
LeTourneau, Inc., R. G.----418-419
Lewis Bolt & Nut Co.----426

M

Magor Car Corporation----486
Matisa Equipment Corporation, The--406-407
Moss Tie Company, T. J.----409

N

National Aluminate Corporation----433
National Lock Washer Company, The--487
Nordberg Mfg. Co.----402
Northwest Engineering Co.----401
Northwestern Motor Company----474

O

Onan & Sons Inc., D. W.----426
Orton Crane and Shovel Co.----475
Oxweld Railroad Service Company, A Division of Union Carbide and Carbon Corporation----432

P

Pacific Coast Borax Co.----478
Pittsburgh Plate Glass Company----435

Q

Q and C Co., The----424

R

Racine Tool and Machine Co.----400
Rail Joint Company, Inc., The----397
Rails Company, The----427
Railway Maintenance Corp.----467
Railway Track-work Co.----424
Reade Manufacturing Company, Inc.----471
Rust-Oleum Corporation----476
Rydin Railway Equipment Company----481

S

Schramm Inc.----465
Service Supply Corporation----483
Simmons-Boardman Publishing Corp.--426
Speno Railroad Ballast Cleaning Co., Inc., Frank----482
Spray Service, Inc.----428

T

Taylor-Colquitt Co.----469
Templeton, Kenly & Co.----477
Texas Company, The----488
Timken Roller Bearing Company, The--403

U

Union Carbide and Carbon Corporation, Oxweld Railroad Service Company----432
United Steel Fabricators, Inc.----480

V

Viking Pump Company----424

W

Wisconsin Motor Corporation----425
Woolery Machine Company----431

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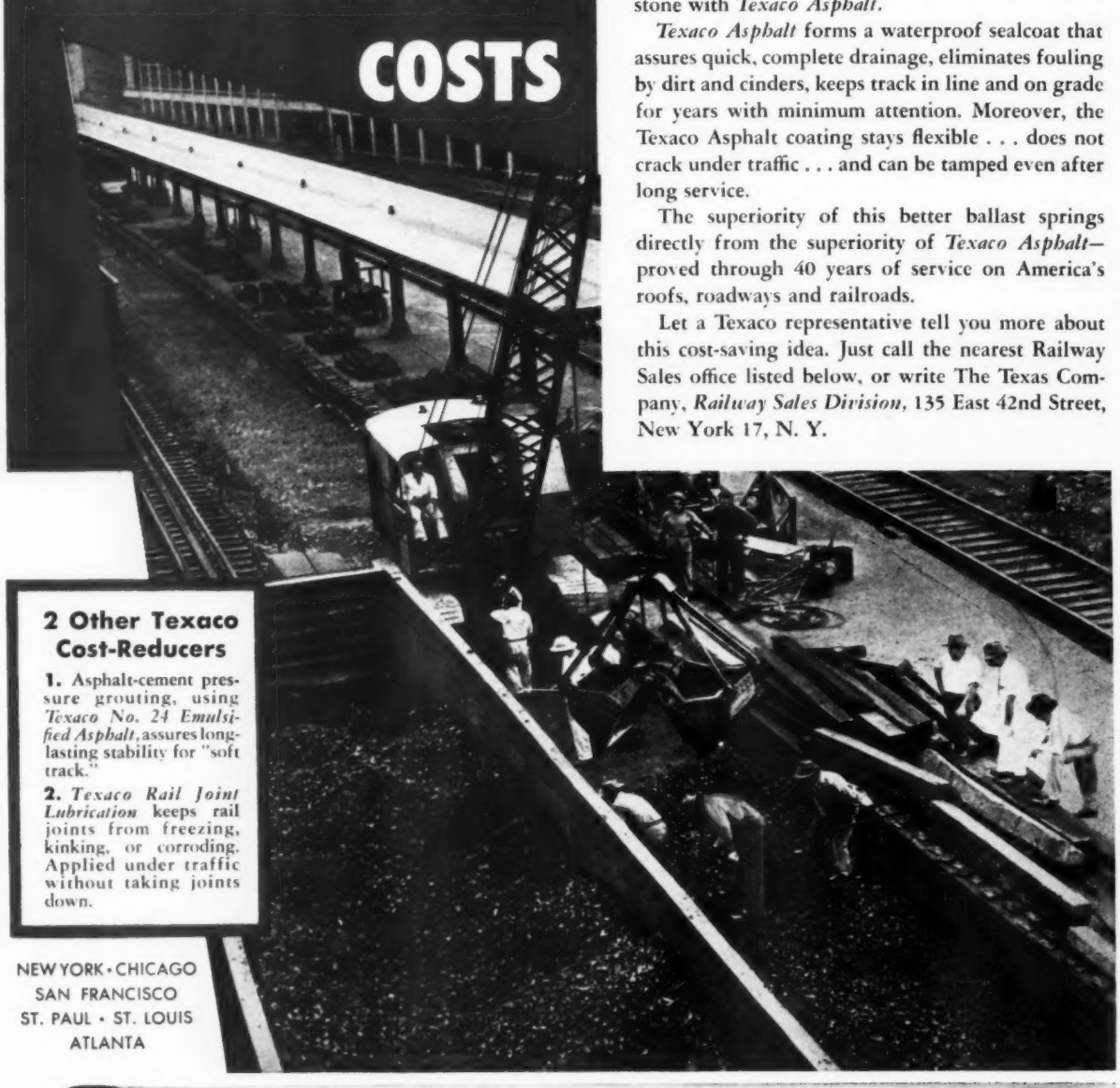

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